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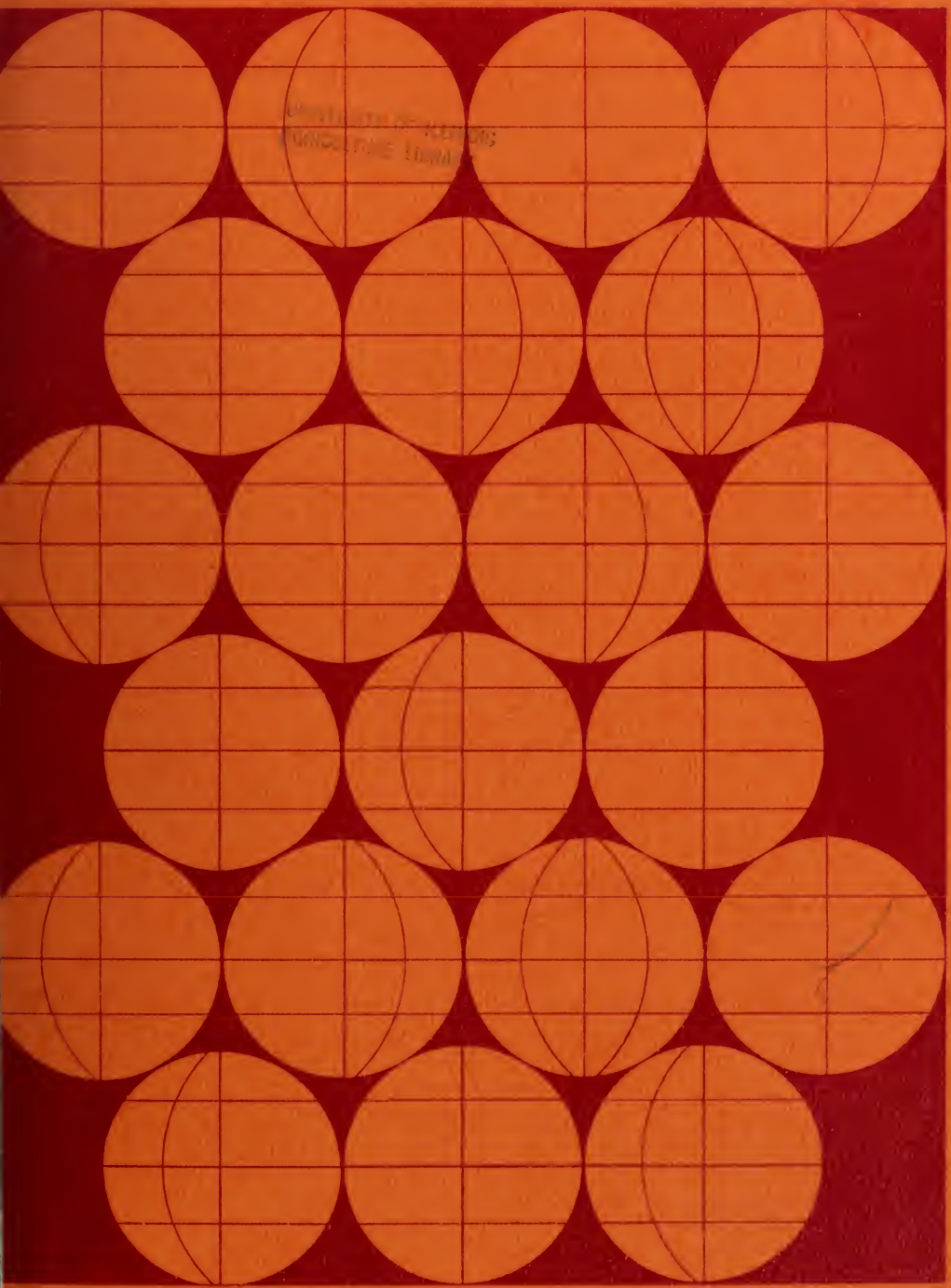

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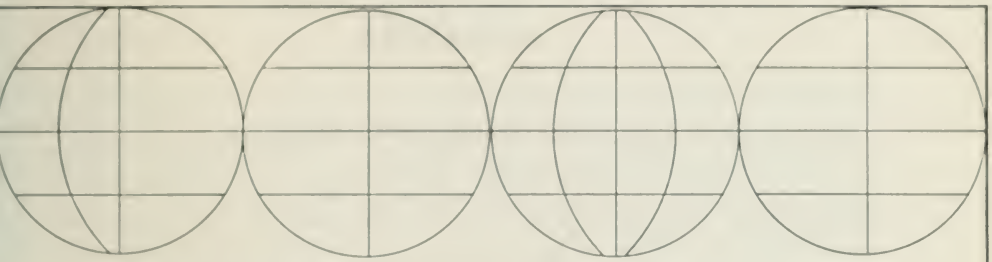
INTERNATIONAL ANIMAL AGRICULTURE



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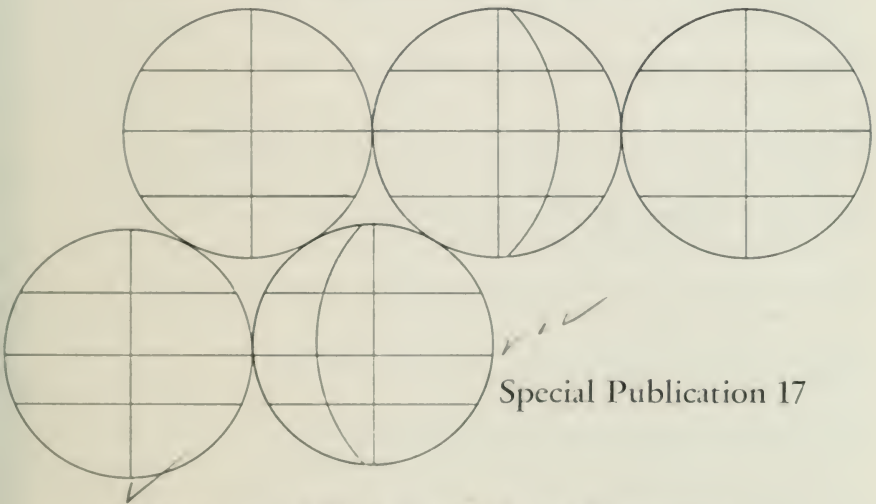

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Opening Remarks

G. W. Salisbury

The twenty-year experience of American universities in resource development of emerging nations has had an important impact on the colleges of agriculture of the land-grant universities. Some of that experience has been exciting and spectacular: it has added a new perspective to the home campus, created a new sense of responsibility among some of the faculty, and brought those colleges into the mainstream of world affairs.

As this nation re-examines its commitments and its resources for helping others, it seems appropriate that at least one professional interest group pause and examine its past performance in international activities. Has the performance been as good or as useful as some would have us believe or as poor or as useless as others have said? Has the experience added something to teaching at home? Has it been worth the candle? If not, how can our performance and our learning experience be improved?

The world's food problem is such that, in one sense, we whose concern is domestic animals are not called upon as the first wave of fighters against hunger. That task falls to the producers of foods from plants — the specialists in soils, fertilizers, and crops — as well as the economists and planners. But in another sense, are not all of us who are teachers and scientists in colleges of agriculture and veterinary medicine really front-line fighters in the war against hunger? Isn't our task always the development of the most important resource of all, educated and trained men who have learned to recognize problems and have learned something about how to solve them? If so, then perhaps we have a first-line position in dispensing knowledge and teaching others how to go about getting more of it. If we do this adequately, then when the need for food from animals has top priority, the stage will have been set for useful accomplishment.

The animal scientist faces a dilemma in animal resource development. It usually takes a lot of input before output is increased. The crop specialist can introduce the seed of an improved variety and in one season test and demonstrate some of its capacities for usefulness. In the normal course of events, however, development of a primitive system of livestock-raising into a food-producing system takes a long time. A great number of trial and error investigations are needed to adapt systems of management for economical production

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of food from animals in environments where they have never before been raised. For greatest economy of effort, these investigations ought to be conducted with the rigor of the best scientific control, but this has never been done. In the test of a single system of management, it may be necessary to determine the best system of provisioning feed for the animals; introduce productive genes into the livestock; identify and control a heretofore unidentified viral infection; and provide systems of harvesting, preserving, transporting, and selling the final product.

Consequently, the large animal specialist on the usual two-year foreign assignment must leave his contribution primarily in the minds of his students and in the form of programs. But we are here to discuss policy, not technique.

This symposium has grown from the 1967 University of Illinois Centennial Symposium on the Land-Grant University and the World Food Needs. It is designed to examine some of the questions university teachers and scientists in the field of food production from livestock have been asking about U.S. government-university contract involvement in agricultural development in emerging nations, where what started as short-run emergency operations has taken on the look of long-run need. Should we involve ourselves even more now or back off and quit? How does our government view the need for university involvement in agricultural development overseas? How should we look at our own function of research and higher education in regard to the problems of food production of the emerging nations? What have we learned from our past experience that could save time in a race with the stork? How can we agree to teach about livestock improvement in the tropics, for instance, if we haven't really researched the problem there? In the face of rising need at home, can we afford to split forces, maintaining only a holding action at home and running the risk of the foreign operation's draining most of our available talent and resources? Must we continue to hide from our own public the depth of our overseas involvement, isolating ourselves from political power so that our government and that of the developing nation can continue to dictate the level of educational service and research we perform? When do the universities cease being mere employment agencies for the U.S. government and begin to follow their own designs instead? When shall we take the initiative to do the task of research and education as well as we know how?

To help us raise even other questions and to provide a basis for judgment about the answers, we have invited a distinguished group of men to devote themselves to these issues at this symposium. The first of these is Dr. Erven Long of the Agency for International Development.

The American Commitment to Economic Development in Emerging Nations

Erven J. Long

Webster's defines "commitment" as "an agreement or pledge, to do something in the future; especially to assume a future financial obligation." In this sense, I feel that there is no firm American commitment to foreign aid at this time.

I say this not critically, but to emphasize the fact that these are times when the public and its elected officials are giving thought to all matters which commit our country and its resources to future courses of action. The commitment to the Marshall Plan for restoring Europe was firm and solid; the commitment to technical assistance in the early days of the Point IV program — and perhaps the commitment to foreign economic aid about eight years ago — was broadly based and substantial. At the present, however, the public mood is to reconsider, to analyze, to ponder, to evaluate. In the long run, it is to the interest of our country that the public think through what the U.S. interests are and what the character of our international affairs should be. What are our responsibilities to ourselves and to other countries? How should those responsibilities be defined and conceived? Inadequate public understanding cannot result in the kind of perservering attention and support that an effective foreign assistance enterprise requires.

It is my intention only to make some personal comments on some of the issues with which Americans are concerning themselves, hoping to stimulate some thought and discussion among you here today.

I should first like to make a general point regarding the cost of U.S. foreign assistance efforts. The price tag of our foreign assistance efforts is not an easy one to read. It can be built up to look very large indeed or reduced to a much smaller figure, depending upon what one includes and excludes. The inclusion of military-related foreign assistance is one example; Food for Peace is another. For this reason I shall not quote figures but shall try to give you an impression of magnitude and of what has happened to what I consider to be the relevant types of aid — the types genuinely concerned with assisting the development of emerging countries — and exclude types primarily attributable to other U.S. interests.

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Roughly speaking, assistance in dollars to the less developed countries has fallen to about one-half the high mark of 1962. This is an understatement of the decline of foreign aid levels because, as we know all too well, the purchasing power of the dollar has fallen off sharply due to steady inflation. In terms of constant dollars, our aid levels have been reduced to perhaps 40 percent of what they were seven or eight years ago. As a percent of national income, the decline has been even greater.

From another perspective, the foreign assistance program is concerned with creating the kind of a world in which our expectations about future security can be realized; therefore, it is properly conceived as one component of the total American effort on behalf of our national security. Again, by my own definitions of what should appropriately be included as economic assistance, about one-fiftieth of our investment in national security activities is in the form of foreign development assistance.

These figures do not include our food assistance under PL 480. We cannot discuss this point at length here. Although food assistance often contributes importantly to a less developed country, this is not always the case, and it is in no sense comparable with dollar assistance. Whatever its merits or demerits, PL 480 must be assessed primarily as a support program for U.S. agriculture rather than as foreign aid. Similarly, our military assistance must be judged primarily against our military objectives rather than as assistance to countries for purposes of their own economic development. In summary, it is important to keep our foreign aid expenditures in perspective: As a barometer of the American commitment to development of the emerging nations, they have been falling rapidly and are in danger of reaching a totally ineffective level soon unless we achieve a much better public understanding of and a deeper commitment to foreign assistance than at present.

What, then, are the issues that are preoccupying the American public and its leaders? The erosion of support for foreign aid is generally caused by the increasing pressure for other uses for public funds, combined with a general sense of frustration over the fact that foreign aid has not resolved problems as simply or as quickly as people may have expected.

There is undoubtedly considerable concern over the effectiveness of aid as an instrument for creating conditions of national security. The foreign aid program has been conceived of as a means by which the American people could influence the development of other countries in such a way that they and we could live in greater peace and harmony. Quite naturally, this has resulted in a built-in expectation that, as our foreign aid proceeds and countries become more developed, our

relations with them should improve steadily and our security interests advance. Personally, I have a great deal of faith in the basic validity of this premise. But it is very often subject to misinterpretation, to over-anticipation, and to evaluation in terms of the wrong objectives.

Although, in the long run, foreign aid is a substitute for military processes as a means for achieving our general security interests in given countries, it is wrong to expect its results to take the same form. Economic development assistance cannot in itself build fences against external invasion of an emerging nation. It may eventually do more than military processes to keep lands and peoples in the free world, but its processes are long-term, subtle, and often indirect.

More significantly, I believe it wrong to assume that economic development alone *necessarily* predisposes a developing country toward congeniality with the United States. Evidence is often cited, for example, that the poorer a country, the greater the likelihood it will undergo internal disorders, riots, revolutions, governmental overthrow, and so on. Since it is proper to assume that our security interests are best served by a stable world order, it follows that to help countries up the ladder of development is to help make them more stable and our relations with them more secure and more rewarding.

Unfortunately, this is only part of the picture. The wars and other serious international problems we have had in the last 50 years have not been with extremely poor but with relatively advanced countries. Germany, Japan, and the Soviet Union were not little, impoverished countries, but countries experiencing the fruits of substantial development — with the resulting capability to do us real damage in military confrontation.

Moreover, development itself can be an extremely disorganizing process. Old structures crumble and new ones arise in their places. Large segments of society which never considered themselves a part of anything beyond their own immediate communities suddenly find themselves immersed in great movements with national purpose. Greatly expanded communication enables ideas to sweep societies much more rapidly — both ideas which stabilize and those which destabilize. So there is nothing about development which either *automatically* assures political stability within a given country or *necessarily* orients that country toward a happy set of political attitudes or relationships with the United States.

I recognize that this sounds as if I am talking against U.S. interest in development assistance. This is not true.

If it is wrong, or at least naive, to assume that economic development in any sense *necessarily* and *automatically* assures better political relationships with the United States, it is even worse to hope for stable, peaceful relations with nations that are deprived of opportunities

for self-development. The onward rush of modern science and technology has seeded the winds of change with a new element — the certain knowledge in the richer and poorer countries alike that the capability for self-sustaining development is achievable for all societies that will exert the necessary effort and self-discipline.

Scientific and technological resources have ignited local explosions in agricultural production for citizens of the emerging countries to witness at first hand. The radically increased yields of the new varieties of wheat, rice, corn, and sorghums have demonstrated to the poorer countries the new achievements possible when the powers of scientific research are directed to their needs. These same scientific and technological forces have dramatized the ephemeral quality of national boundaries as observed from the perspective of a lunar orbit. Most importantly, the processes of communication have been accelerated so that all nations come to share in the knowledge of what is possible — and all peoples demand that the possible be made operative in their own lives.

The question, therefore, is not whether economic development of the emerging nations should take place, or how fast, or whether we should assist them. These questions have no alternative answers. The real questions are concerned with how development takes place within these countries; what kinds of economic, political, and social institutions are created; how broadly based is the economic and political participation of the general public; in short, what kind of society is created by the process of development? This is what constitutes our long-term security interests in the development of emerging nations.

It is important that we recognize that the objectives guiding the movements of national development are themselves largely defined as they unfold. The nature of these objectives, and the kinds of institutions which are created to achieve them, deeply and fundamentally determine the character of the country which emerges. Just as the processes of childhood shape the character of the adult, so is the eventual character of a mature nation determined by its early developmental processes. In our own history, the impact of our frontier and of our agricultural origins influenced for generations the character not only of our countryside but also our cities. The character of our institutions and government and, in a profound sense, our very people has been influenced by the institutions we brought over from Europe, the processes by which we extricated ourselves from colonial rule, and the types of schools and local governments we have. This is even truer in the less developed countries because they are changing so much more rapidly than did we.

To the extent that it is intelligent and effective, our participation in building the institutions, shaping the policies, and developing the human resources of the developing country helps shape the basic

character of that country, thus charting that country's relationship to our own. We should recognize that this is a two-way relationship: Our participation in their institutional development should give us fresh perspective on our own history, and involvement in their problems should help us understand ours.

We should not be surprised if this process of foreign assistance takes time, for like any other instrument of policy and diplomacy, it is not always immediately successful. Especially we should recognize, as I said earlier, that it is not only the rate but also the form of development of the emerging countries, not only the level but also the nature of our assistance, which most profoundly affects our ultimate security interests.

All this leads inevitably to the conclusion that foreign aid — especially technical assistance — must become a basic, long-term instrument of U.S. public purpose. In his book *Witness for AID,* Judge Frank M. Coffin, former Congressman and former Deputy Administrator of AID, eloquently phrases this proposition:

> In an era of restraint in the use of arms, aid will increasingly become a principal instrument of policy. Military forces are no longer the chessmen of international affairs. Words alone are hollow. Aid has emerged on the modern scene as an inevitable instrument serving the policy of great and not so great powers. We may dispute this fact. The Communist countries do not.

I should like to comment on the forms of aid necessary to best serve the future needs of both the developing countries and our own. This will require a brief analytical digression.

In my opinion, the root cause of underdevelopment is pervasive technical inefficiency. The agricultural sectors of the less developed countries are, virtually without exception, extremely inefficient and hence incapable of making their essential contribution to general economic growth. Typically, this technical inefficiency pervades all processes: technical production, administrative and governmental, institutional and educational. This pervasive inefficiency results primarily from the historic failure, or inability, of these countries to invest in the research and development activities necessary to create effective processes for the conversion of resources and effort into desired output results. Where this is true, obviously the possibilities of closing the gap between the advanced and less advanced countries through simple transfer of resources or capital are quite limited. Rather, we must give incisive attention to means of improving these technical inefficiencies.

The ultimate outcome of economic assistance efforts will turn primarily on the world's ability to harness the potential powers of science and technology to the needs of the less developed countries,

and to provide the capital and other support for their effective utilization in those countries. For we are unquestionably entering a period of technological revolution — a revolution which at long last may be brought to serve the account of the less developed nations.

Recent scientific advances promise to alter substantially the parameters of economic development of the emerging nations. As virus research eliminated the scourge of polio, so agricultural research promises to eliminate the scourges of starvation and malnutrition. The high yield varieties of the major cereals are proving the point, insofar as solving caloric deficiencies is concerned. Similarly, improvement of protein content through genetic manipulation is promising to solve the principal nutritional deficiency of the poor-diet countries. Non-conventional sources of animal feeds, combining inorganic nitrogen with inexpensive sources of carbohydrates and cellulose, are merely awaiting additional adaptive research to reduce vastly the cost of ruminant livestock production in the tropical countries.

Later on, perhaps, changing the basic growth capabilities of plants may permit food production from irrigation with sea water; new approaches to pest control, possibly through establishment of lethal genetic traits, await scientific exploration. An AID research project with the University of Illinois may provide a malaria vaccine to supplement or replace present costly methods of malaria-vector mosquito control.

But a foreign assistance effort designed to bring the powers of science and technology to bear on the economy-wide inefficiencies characteristic of the emerging nations will require substantial shifts in emphasis. During the decades immediately ahead foreign assistance will require massive technical, technological, managerial, and administrative improvements in these host countries. It will require that we place much more emphasis than heretofore upon programs of scientific cooperation, research, education, other institutional building, and human resource development. It will require much stronger, two-way bridges between the less developed countries and our own to carry the necessary traffic for scholarship, research, scientists, and students. The goal is the evolving of a great expanding web of research and education, which will incorporate into the entire free world the rapid on-rush of modern science, technology, and knowledge.

And now a prediction. In spite of the grim realities of decreasing budgetary support for foreign assistance, I believe that American scientists and highly trained professional people will be working meaningfully in developing countries for at least the rest of the century. For, unless we work energetically to prevent it, the economic gap between the advanced and less advanced countries will continue to

widen for at least that long, and it will continue to be essential to our national interests that such a trend be reversed.

The levels of resource transfers — at least as a proportion of our national income — may not greatly improve. But our aid may well shift into substantially more effective forms, from food and other consumables, possibly even from capital subsidization, toward scientific and educational programs which will involve more, rather than fewer, American scientists and professionals.

In the end, of course, it will all depend upon the public asssessment and understanding of the possibilities and awareness of the alternatives. No greater responsibility or privilege could be afforded any group than to participate — as you have chosen to do — in that assessment.

The Animal Science Department Looks Overseas

George H. Axinn

"America's basic self-interest in world development stems from the brutal fact that there can be no sanctuary for the rich in a world of the starving." Those are words spoken by Richard Nixon a year before his election as our national president (*1*).[1]

As the panel on world food supply put it in the report of the President's Science Advisory Committee in May of 1967, "The stark misery of hunger, the ravages of malnutrition, the threats of civil strife, social unrest, and political upheaval posed by food shortages, and the shadow cast by impending famine have all been portrayed in urgent and compelling terms. The need for the United States, other developed nations, international agencies, and voluntary institutions to help the hungry nations has been pointed out time after time" (*2*, p. 3).

For professional personnel in the university departments which deal with the animal industry, the need is more than one of humanitarian assistance to the peoples of emerging nations. There is a parallel and interrelated need for internationalization which is associated with professional survival.

Our students come from all over the world. Our graduates work all over the world. There can be no professional excellence in animal husbandry, in veterinary medicine, in the animal industry — or in nutrition, genetics, physiology, livestock or poultry management, or marketing — if these disciplines lack international dimensions.

Let us look first at the world situation and world needs and then at the universities and their role.

The old cold war split of the world into two camps has lost its meaning for foreign assistance. Both we and the Communists have discovered painfully that the bulk of the world's people have been much more resistant to our influence and much less subject to our control than we had expected. The emergence of a compatible and a congenial environment in a more and more interdependent world of increasingly modernized states should now become our goal.

We can assume that governments, particularly in the developing nations, will change from time to time and will not always be to our liking. In spite of these changes, the *people* of such nations will con-

[1] Numbers in parentheses refer to references listed at the end of the article.

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tinue to have problems of technological, economic, and social development.

By the year 2000 there will be four times as many people in the developing countries as in the developed nations. As the panel to which I referred a moment ago recently reported, "the scale, severity, and duration of the world food problem are so great that a massive, long-range, and innovative effort, unprecedented in human history will be required to master it" (*2*, p. 11).

While our domestic concern is appropriately consumed with racial conflict, urban decay, and critical poverty here, the rediscovery of our national character has established the direction by which we shall overcome. But the larger international manifestation of the same root problems remains before us. The most coercive fact of our age is that the poor people of the world have learned that poverty is not inevitable!

Our commitment as a nation should be to assist the disadvantaged peoples in their desire to enter the modern world. To be effective this commitment to human development should be sustained and continuous, as independent of the intermittent shifts in government-to-government relationships as possible. Although we are not going to remake the entire world, we can contribute to its betterment.

Such sustained commitment to global human development is not only sound in terms of those being assisted, but it also brings together our long-term security interest, our economic interests, our cultural and social interests, and our deep and historical moral concerns with the welfare of common men everywhere. It is in the interest of the United States to see Latin America, Asia, and Africa enter the modern world, not only because of the resulting demand for trade and our immediate prosperity, but also because of the kind of neighbors who will be sharing this world with our children.

Further and more significantly, such an articulation of policy would transcend the current confusion of national purpose and permit us to come to grips realistically with the contemporary meaning of our fundamental national tenets that "all men are created equal" and that the appropriate American way to approach the world is with "malice toward none and with charity for all."

Thus our realistic concern with U.S. national interests converges with our moral and humanitarian concern with poverty. It is time we abandon both our legislative "scare tactics" of international involvements designed to keep us ahead of the Russians, and our short-term, self-interested practices of dumping agricultural commodities abroad to bolster prices at home and of providing soft loans to strengthen demand for our industrial products abroad. Instead, we need to substitute programs guided by the long-range policy of making this world a better place for our children and our grandchildren to live in.

Have we learned from experience?

What can the land-grant universities and in particular the departments concerned with animal industry do about all of this? In a nutshell, we can help fulfill the demands of the hungry people of this world for higher quality food — particularly higher quality protein — at a lower cost. That may be only part of the total world problem, but no other part is more significant.

As Dr. Glenn W. Salisbury said at the Symposium on the Land-Grant University and World Food Needs here at the University of Illinois in October of 1967, "What the developing countries will need is no less than what the United States has needed all along — a basic core of teachers and researchers dedicated to the production of educated, industry-oriented practitioners and experts. These people in turn would be engaged in elimination of disease in better-bred, more efficient livestock from which high-quality foods can be harvested, processed, and marketed for the human population" (*3*).

We and our colleagues have been moving about the world during the last two decades trying to assist in this effort. With much trial and some error we are beginning to understand what needs to be done in terms of the world's food supply and the rest of international developmental assistance as well.

For example, we have learned that Americans simply do not have the "know-how" to make two blades of grass grow where one grew before — at any given spot on the globe. Our technology is not sufficiently general to make it fruitful for us to send extension people abroad merely as transmitters of what is already known here. This was a difficult lesson for us to learn. The myth that American technicians and professors had the know-how to solve all the world's problems misled us. Instead of beginning with rigorous scholarly research on economic development, on institution building, and on the complexities of technical assistance, the academic community journeyed overseas as seasoned practitioners.

One result was a good deal of frustration.

We also went overseas trying to duplicate our own USDA/land-grant college system of agricultural education, research, and extension. For the most part the people who were sent understood only the artifacts of this system, rather than its essence, and thus ran aground largely on the morass of cultural variation, failing miserably in the total exercise.

The best animal breeder in the world — if he didn't know the local language; if he were unaware of local customs, norms, and taboos; if he didn't understand which channels of communication were open to him and which were closed; and if he were attached to an institu-

tion whose functions were not seen by its indigenous members at all the way he saw them — would be doomed to failure in spite of his own professional excellence, dedication to the task, and willingness to give himself to it entirely.

But just as we have learned to build better automobiles, airplanes, radios, and highways, making those of the 1940's obsolete, so are we learning to improve our developmental assistance operations. We are learning how to put together programs which will have greater impact, more long-run effectiveness, and perhaps even lower costs. Our successes and our failures deserve thorough study; the results should guide our planning for the future.

Al Moseman of the Agricultural Development Council put his finger on the problem in a recent paper: "A major deficiency in the past cooperative efforts has been the omission of the ultimate objective of building the indigenous institutionalized science capability into a national, self-sustaining system. The special challenge — and one of increasing urgency — is to associate the technical assistance resources available to a developing nation as separate specialized projects into a coordinated effort to establish such a national research system" (*4*).

Dr. F. F. Hill of the Ford Foundation, speaking in November of 1966, suggested that a number of carefully selected agricultural colleges and rural universities in developing countries and an equal number of U.S. land-grant colleges be asked to make joint institutional commitments to mount sharply focused, long-term research programs designed to substantially improve the production technology of important food crops. He went on to say that the need, as he saw it, "is for carefully planned, sharply focused, production-oriented research programs that are adequately staffed, adequately financed and continued for sufficiently long periods of time to produce significant results" (*5*).

The Task Force of the National Association of State Universities and Land-Grant Colleges, in a recent statement on international developmental assistance, listed many lessons we have learned (*6*). First among these was that the full development of a country requires a multiplicity of institutions — political, economic, and social. Further, human resource development is the most critical need throughout the world. The Task Force acknowledged that an ample food supply is essential to stability in economic and political development, but went on to suggest that the most effective and enduring contribution to human resource development is the building of indigenous educational institutions which will enable a nation to help itself by educating its own people to enter and sustain themselves in the modern world. The building of enduring institutions is a long-term proposition and is fundamental to success of our developmental assistance policy.

They also said that the best continuing sources of competent and experienced professional personnel to carry out many programs of institution building abroad are the American universities and colleges — the very departments represented here today.

Their plea was, "The full range of analytic and research resources (public and private; domestic and foreign) should be mobilized in order to improve understanding, for each overseas area, of the biological and physical resources, and the economic, social, political, and psychological forces at work; the critical obstacles to effective modernization; and the alternative ways that outside human and financial resources can be brought to bear in helping the host country to deal with those obstacles." They said there is a critical need for a limited number of high quality research and training centers in developing countries to concentrate on food and population problems that are significant on a regional or international basis. Through such centers the best scientific and technical resources of the developed world would be focused on these problems.

Plans for the future

And this is where the university community comes in. The universities and colleges of the United States, after two decades of partnership with the U.S. government and private foundations in the worldwide work of international developmental assistance, have moved from a period of great expectations but minimal skill and competence to the beginnings of sophistication. Twenty years of this university experience abroad has resulted in the emergence of a major new resource to this nation. My former colleague, Glen Taggart, calls it "a critical mass of manpower competence in international education" (7). It developed as a natural byproduct and has produced a readiness for exciting encounter and considered commitment to the new world community of scholarship. It has also begun to qualify America's teachers to provide our sons and daughters with a more adequate preparation to cope with the international problems they will face in ever enlarging proportions.

Moreover, modern scholarship is less than excellent when bound by its own culture. As Dr. Irwin Sanders of Education and World Affairs wrote recently, "National boundaries are becoming increasingly irrelevant to the practice of most professions. In the future — perhaps 25 to 30 years from now [Sanders says; I would say it has started already, and will take much less time] — it will be just as normal for a professional person to take on foreign assignments (which will no longer be called foreign) and clients as it is today to concentrate on domestic practice.

"When this occurs, the professional person will be prepared to recognize and deal with cultural differences in the same way that they now deal with individual differences. If successful in domestic practice, the professional treats no two clients exactly alike. The same will hold true in international practice, but it comes about only if one knows something about the backgrounds from which the clients come.

"Furthermore, there will be a heightened sense of supernational colleagueship. Already the professional person in a developing country is able to maintain a sense of identity and self-respect in the face of low standards of living and culture by reminding himself that he is not merely a member of a backward nation but he is also a member of a worldwide profession for which he holds the proper credentials. International exchanges, largely related to much less expensive air travel, will bring about an ever increasing scale not only of the exchange of published materials, but also the opportunity for face-to-face contact among those interested in similar professional problems, though based at widely different spots on this shrinking planet" (*8*).

Experience has demonstrated that the quality of what university personnel are able to do overseas in development assistance programs tends to be related directly to the quality, the commitment, and the continuity of related international education thrusts on the home campus.

However, the interaction between university personnel involved in developmental assistance abroad and their colleagues associated with the area centers and similar home campus activity has been extremely weak. Rather than support each other and exchange enrichment, these two groups tend to avoid communication. To improve this situation and to support top quality in what American university personnel can do abroad, here are ten suggestions. Many of them stem directly from the work of the recent CIC-AID research project on building agricultural institutions which was led by Dr. Ira Baldwin of the University of Wisconsin (*9*).

First, there should be a provision for exploration in depth by teams of university personnel and the development of appropriate long-range strategy before a university commits itself to participation. This strategy should be acceptable to the host country, relevant to the U.S. universities' academic program, and consistent with the program of the funding agency.

Second, vigorous, searching, and continuous recruitment and selection of only the most competent personnel for overseas development assistance assignments is critical. As Richard Wood (*10*) says on the role of universities in AID-financed technical assistance overseas, "related to and towering over all other factors in importance are the *people* who are entrusted with the task of carrying out the project."

Third, along with adequate recruitment and selection, personnel should have appropriate preparation for each particular overseas assignment.

Fourth, there should be provision for continued research that is relevant to the overseas assignment, as well as to the career interests of the individual scholar, both while he is overseas and after he returns to the home campus.

Fifth, there should be provision for graduate students to accompany senior scholars to overseas locations where the students can collect data for their theses.

Sixth, arrangements should be made for selected overseas experience to be incorporated into the curriculum and the appropriate course syllabuses.

Seventh, programs should be designed with a long enough commitment that departments may staff themselves to cover responsibilities both at home and abroad. This means that the one- and two-year contracts have no place. The ten-year grant or the non-terminal project agreement must replace the contract as funding documents.

Eighth, there should be provision for frequent personal involvement at overseas sites by appropriate department heads and deans.

Ninth, professional persons such as ourselves should see to it that people from our departments who serve abroad can remain in the mainstream of their professions, continuing to contribute to their fields technically while away on assignment, so they can thereby move quickly back into a productive role at home when they return.

Tenth, and finally, continuity of progress in rank and salary during intermittent periods of absence from the home campus should be at least as rapid as for less adventuresome colleagues who stay at home.

Goals to aim for

A long-range goal for the nation and its universities is a dynamic global interaction among scholars, interrelating educational programs around the world. Overseas universities will be the peers of U.S. universities, fully able to prepare the manpower their respective states require for developing their potentials and doing the research necessary to keep up with the demands for modern agriculture, expanded industry, improved health facilities, and other changes. Reciprocally, the academic process at home will develop a generation of U.S. graduates excellently prepared to cope with the world-wide problems which they will face.

The linkage between any two institutions in this worldwide network could be characterized by any of a wide range of relationships: a partnership of two professors, one in each location; an individual who builds his career with intermittent assignments at each; department-

to-department associations; involvement as part of a consortium of several institutions at one or both ends; library exchanges; student exchanges; graduate student research base operations; exchanges of research data or specimens; and many other possibilities.

One aspiration for the worldwide community of higher education is that it will transcend the fluctuating periods of better and worse relationships among any two nation states, flourishing in periods of good will and cooperation yet surviving periods of malice and animosity. Thus will it serve as an international force toward understanding, harmony, and trust.

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The Function of Veterinarians and Animal Husbandmen in Foreign Animal Agriculture

Rue Jensen

The respective functions of animal husbandmen and veterinarians are separate but complementary. Veterinarians depend on animal husbandmen for actual improvement of livestock through breeding and feeding management. Without these improvements, animal agriculture would have low productivity, and the need for veterinarians would be negligible. On the other hand, animal husbandmen depend on veterinarians to protect the health and to aid in the survival of improved livestock. Without such protection, animal numbers could be decimated and animal productivity impaired.

In the United States, most agriculturists fully understand these respective functions of animal husbandmen and veterinarians in developing animal agriculture. Outside this country, however, the distinctions between the two fields may not be clearly discerned. This is exemplified at the University of East Africa, University College, Nairobi, Kenya, where Colorado State University has a contract to help develop teaching and research competence in a Faculty of Veterinary Science. The University College is also receiving help from the veterinary faculties of the University of Glasgow, Scotland, and Justus Liebig University, Giessen, Germany. Many of the European veterinarians believe that an extensive curriculum with all necessary facilities in animal husbandry should be developed within the Faculty of Veterinary Science. To me, this attitude indicates a failure to realize that the animal husbandry profession and the veterinary medical profession each has dimensions of such size that no one person can master all aspects or become expert in both.

What should be the tasks of animal scientists working at foreign universities? Collectively, their functions are two-fold: to help the recipient country improve animal agriculture and to help the foreign educators develop sufficient educational and technical skills to assure continuation of the new activities after the Americans leave. To add assurance and permanence to the AID program, most contracts join an American university with a foreign university or with a Ministry of Agriculture in the recipient country. American animal production specialists and veterinarians work directly with the local personnel. The man-to-man association facilitates acceptance of the proposed changes

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in traditional practices. In some cases, unfortunately, counterpart personnel either are not available or have deficient skills and information. The need for changes in agriculture as practiced in the recipient country and the need for changes in instruction in its universities often parallel each other.

In general, animal husbandmen overseas work to develop animal agriculture, relate it to other phases of agriculture, and adapt it to the entire economy of the country. Their specific activities are to work with their counterpart personnel in five important ways:

1. To determine the potentials of animal agriculture in a country and region. Frequently, this study is done when the feasibility survey of the project is made and before the US/AID contract is completed. The study should determine specific species, breeds, and numbers of livestock and poultry, and indicate the location and size of the markets for products.

2. To improve the genetic make-up of livestock types used in the project by selective breeding of the country's breeds or by introducing superior foreign breeds.

3. To correct nutritional deficiencies of livestock and poultry by introducing balanced but economical rations.

4. To establish correct management practices in caring for animals and in keeping records.

5. To develop modern training for animal husbandry at the country university. Agricultural training in the country university may be obsolete or even absent. In either case, a new curriculum is needed, and it must be made attractive to country students.

Fulfillment of a foreign assignment in animal husbandry may require several years, even for established professionals. Breeding improvements are slow and expensive. The acceptance of new management practices in the industry requires adult education and demonstration. A new curriculum can be planned in only a few months, but its acceptance is gradual and the training of students slow. In many contracts five to ten years are required to initiate a new curriculum, train a limited number of faculty personnel, and see several classes of students through four years of education.

Let us now consider the equally important role of the veterinarian. The primary functions of veterinarians in the animal agriculture of the developing country are to help counterpart individuals create an environment amenable to livestock improvement and profitable production, and to help develop productive and healthy cattle, poultry, and other animals. To achieve this, veterinarians must determine specific livestock diseases of the country and region, control serious endemic diseases, and develop modern country or regional universities for training local veterinarians.

Most developing countries with potential for animal agriculture have had surveys for determining the existing animal diseases. Some accurate information is then already available about the identification and incidence of major acute infectious diseases, such as foot-and-mouth disease and rinderpest. Parasitosis, nutritional deficiencies, and toxicities, however, frequently may have been either neglected in the surveys or unknown as to occurrence or incidence. Accurate statistics on diseases are necessary for developing programs of disease control.

Control of major infectious diseases is also necessary for the development of animal agriculture in any country. Maladies such as foot-and-mouth disease, rinderpest, African swine fever, African horse sickness, lumpy skin disease, East Coast fever, piroplasmosis, and fowl plague cause episodes of high mortality and incapacitation, deterring development of any livestock industry. Methods of control vary with circumstances: Some diseases are eliminated or reduced by identifying and slaughtering infected animals, others by artificial immunization with vaccines, and still others by destruction of vectors. Regardless of the method employed, the cost is high and the decision-making task of the veterinarians is crucial.

The protection of livestock against disease is a continuing task that requires vigilance against reintroduction of previously known and controlled diseases and research against newly recognized or inadequately controlled diseases. Fulfillment of these functions requires a reliable supply of competent veterinarians trained in the country university.

As a solution to the combined problem of high educational costs and relatively low numerical demands, one country university may train veterinarians for an entire region of several countries. For example, at the present time the University of East Africa, University College, Nairobi, is being considered as a reasonable training center for veterinarians from several countries adjacent to Kenya. The economic and educational advantages are real, and they may be achieved if enough energy, skill, and money can be assembled to solve the problems.

The Problems of Direct Participation in Foreign Assignments

W. N. Thompson

Frankly, I am reluctant to concentrate on "problems." I have learned that it is a rare individual who wants to hear an elaboration of the problems associated with his area of interest. It is much more satisfying to hear someone accentuate the positive. One who focuses on problems runs the risk of being labeled "pessimistic," "impatient," or if a foreign assignment returnee, "bitter."

My remarks are made from the perspective of a two-year assignment as team leader on the University of Illinois AID contract project in Sierra Leone and the more recent experience of three years as Illinois leader for the CIC-AID Rural Development Research Project.[1] This project was a study of efforts of 35 U.S. universities on 68 agricultural AID contract projects in 39 countries from 1951 to 1966. The University of Illinois part of the study was primarily to assess the impacts of agricultural AID contract involvement on U.S. universities and to develop guidelines for improvements in organization and implementation of such projects. Data were obtained from university project files, mailed questionnaires, and interviews.[2]

The University of Illinois project report (*5*) was described by one of my animal science colleagues as "a devastating comment written

[1] The CIC-AID Rural Development Research Project, completed June 30, 1968, was supported in large part by the Agency for International Development through a research contract with Purdue Research Foundation. The project was sponsored by the Committee on Institutional Cooperation, with the following universities as active participants: University of Illinois, Indiana University, University of Minnesota, University of Missouri, North Carolina State University, Ohio State University, Purdue University, Utah State University, and the University of Wisconsin. For a summary of the project, results, recommendations, and publications, see (*1*).

[2] Questionnaires were received from 598 university contract team members and team leaders who had returned from overseas service, 315 wives who had accompanied them, 336 colleagues of those who had served overseas, and 141 department heads. Animal scientists (including those in veterinary medicine) among the respondents were: returned team members and leaders, 103; colleagues, 60; and department heads, 31. Returned staff members, department heads, and college of agriculture and university administrators were interviewed on 32 university campuses. Fifty-four AID Washington personnel completed questionnaires, and 44 were interviewed.

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in tranquil words." A commentator who had read both the Illinois project report and another CIC-AID paper (*3*) remarked, ". . . I can't help but feel that they learned much more than they have told us so far. Maybe we need another session to find out how it really was" (*2*). With my previously mentioned background, I welcome this new opportunity to concentrate on the problems in this type of work and to tell you "how it really was."

One can find strong views within the university community on the question of university participation in AID contract programs. The views of an animal scientist serve as an example (*4*):

> It is unfortunate that US/AID programs, at least in their interaction with universities, have been so politically and performance-oriented and never deliberately academic and exploratory. One suspects here the disproportionate influence on the Congress of the ubiquitous USDA, which is oriented toward direct performance, production research, and law enforcement, rather than education-oriented. The effect has been to hamper, if not completely handcuff, the capabilities of University men employed in US/AID projects. The land-grant universities have been reduced largely to the role of employment agencies for government (the personnel sought were their own people in a time of explosive local demand for educators). The professors engaged for AID projects are reduced to "show and tell" technicians on foreign assignments.

It is not unusual to hear such views. Some are so critical of AID contract project involvement of U.S. universities that they virtually "write off" participation in such projects as having potential for universities. It should be clear at the outset that I am not to be counted among that group. Nevertheless, the following assessment of general effectiveness of universities in AID contract projects should make it obvious that there are opportunities for improvement. Research analysts on the CIC-AID Rural Development Research Project who had visited overseas projects and U.S. university campuses made admittedly subjective ratings based, however, on several criteria.

One must interpret the judgments expressed in these data with varying qualifications. One-third of the "poor" overseas projects were initiated during 1954-1955 when AID encouraged rapid expansion of university contract projects. Seven of the 30 "fair" and "poor" overseas projects were terminated before they had been underway for as long as five years. A number of the projects were confronted with difficulties in the host country beyond the control of the U.S. government or university. The home campus ratings — my main concern — of the 32 U.S. universities studied were fully as variable as the overseas ratings, with two-thirds of the universities rated as "fair" or "poor."

Regardless of our views regarding university participation on AID contract-type agricultural projects, it must be recognized that this is

Table 1 — Ratings of Overseas Project Progress or Success and U.S. University Campus Effectiveness[a]

Rating[b]	Overseas projects	U.S. universities
Outstanding (4.5 to 5.0)	8	5
Excellent (3.5 to 4.4)	7	2
Good (2.5 to 3.4)	6	4
Fair (1.5 to 2.4)	10	8
Poor (less than 1.5)	20	13
Total	51	32

[a] Ratings for overseas projects were made by overseas research analysts based on the following criteria: (1) completion of project objectives or progress attained; (2) general performance of the contract team; (3) team leader and team member attitude, effectiveness, and team strategy; (4) U.S. university commitment to the project; and (5) U.S. university backstopping. U.S. university campus ratings were made by project research analysts based upon: (a) U.S. university commitment to overseas projects; (b) campus administration performance; and (c) feedback from experience under contract projects. Ratings were made only if analysts had visited the overseas project or U.S. university.

[b] Ratings were made on a letter scale ranging from A to C; they were converted to a numerical scale of 5 to zero.

Source: Thompson, *et al.* (5, p. 165).

the means through which we have gained a substantial amount of experience in the less developed countries. Realistically, future involvement of universities in international work is contingent upon financing by and cooperative programs with the federal government.

We are still operating from a narrow base of international experience. The average annual man-power input into 63 agricultural AID contracts has been less than seven persons, with about two of the seven being recruited from non-university sources. Even when some universities have had more than one contract project, the personnel involved has been a small proportion of the total agricultural man-power resources of U.S. universities. At the same time, experience accumulated over the past 17 or 18 years ought to be sufficient to generate the potential for increasing U.S. university effectiveness in international work. There is thus justification for the criticism that we are not making adequate use of the experiences that we have had.

Problems

Because it is difficult to classify the many problems of university participation in international development work, particularly for a short paper, I have chosen to lump the problems into seven categories: the history of participation, conflicts with ongoing activities, lack of professional status of international work, disruption of careers, education for international service, administrative problems, and obscurity of goals and lack of commitment.

The history of participation. Our experiences present a legacy of problems as we try to draw on these experiences for lessons leading

Table 2 — Responses of University-AID Contract Assignment Returnees, Colleagues, and Department Heads to the Statement: "With present world conditions, international technical assistance needs to be a definite part of our department's program"

	Returnees		Colleagues		Department heads	
	All disciplines	Animal sciences	All disciplines	Animal sciences	All disciplines	Animal sciences
	(percent)	*(percent)*	*(percent)*	*(percent)*	*(percent)*	*(percent)*
Strongly agree	63	59	43	30	52	55
Agree somewhat	22	27	42	42	35	29
Undecided	2	5	4	8	6	7
Disagree somewhat	4	3	6	13	4	6
Strongly disagree	1	1	3	5	2	3
No response	8	5	2	2	1	0
Number of responses	598	103	336	60	141	31

to improvement. For the most part, universities have been reacting to the needs of the federal government for assistance in international development. Many faculty members complain that universities are in the position of reacting to external stimuli. At the same time, few faculty members are devoting attention to building programs that are meaningful from the university point of view.

Most university-AID contract involvements grew out of the interests of a limited number of administrators and faculty members who felt the need for international service. There was inadequate participation of faculty members in the decision to initiate projects. This has led to personal involvement of a limited number of university personnel without strong institutional commitment. Some of these attitudes are still with us, so faculty members and department administrators are prone to assume that future programs must be similar to past and current ones. Moreover, when a project proves less than highly successful, AID is often criticized either in Washington or in a foreign country, without taking a careful look at the university and its performance. University participation in technical assistance too often gets labeled as just another foreign aid program. *The point is that it is difficult to break away from the images, impressions, and attitudes that have been developed over the past two decades.* How can we learn from the experiences of the past, sort the favorable experiences from the unfavorable, work at correcting deficiencies, and move ahead with the pressing challenges that face agriculturists on domestic and international fronts in a future of fading geographic distinctions?

Conflicts with ongoing activities. Despite the numerous problems in foreign assistance programs, there is a strong consensus among administrators and faculty members of colleges of agriculture that their colleges should be involved in international technical assistance. Returnees from foreign assignments, their colleagues, and department heads were asked to express opinions and attitudes on a number of statements in terms of their agreement or disagreement. To the statement, "With present world conditions, international technical assistance needs to be a definite part of our department's program," some 85 percent of all groups were in agreement. It was interesting to note, however, that the animal science colleagues, most of whom have not had international experience, had a lower degree of agreement with this statement than their department heads, fellow animal scientists with international experience, and other disciplines. About one out of five of the animal science colleagues disagreed with the statement.

While there is agreement with the general idea of including international work in the program of agricultural departments, one gets a somewhat different view from the response to the statement, "With all the demands upon our staff, our department would be better off if we

Table 3 — Responses of University-AID Contract Assignment Returnees, Colleagues, and Department Heads to the Statement: "With all the demands upon our staff, our department would be better off if we did not have to give up staff members for overseas assignments"

	Returnees		Colleagues		Department heads	
	All disciplines	Animal sciences	All disciplines	Animal sciences	All disciplines	Animal sciences
	(percent)	*(percent)*	*(percent)*	*(percent)*	*(percent)*	*(percent)*
Strongly agree	5	6	12	12	10	13
Agree somewhat	13	19	21	26	29	36
Undecided	3	0	7	10	9	6
Disagree somewhat	28	34	33	25	27	32
Strongly disagree	40	33	25	25	23	13
No response	11	8	2	2	2	0
Number of responses	598	103	336	60	141	31

did not have to give up staff members for overseas assignments." Among animal scientists, nearly one-half of the department heads, two-fifths of the colleagues, and one-fourth of the returnees from overseas assignments agree with this statement. It should be of particular interest to note that animal scientists more strongly agree with this statement than do the average of all agricultural disciplines.

Attitudes toward international work are influenced by the ways that international programs affect individuals and the department's program. It is clear that AID contract projects have competed for personnel within university departments. The faculty member who goes overseas cannot easily be replaced by one of equal training and experience. Those who remain are asked to accept some of the responsibilities of the departed staff member. This is interpreted by many as interfering with their ongoing work and professional development. One-half of the animal science department heads and one-third of the colleagues indicated that assignment of work from persons going overseas to others interferes with the professional growth of the staff members who must do this work.

About 60 percent of the animal science colleagues judge the work done by the replacements of those who went overseas to be less satisfactory than that of those who went. Department heads also view this as a problem in about 50 percent of the cases, the problem being more serious in student counseling, research, and extension than in teaching.

Often, the problems of personnel management arise because the position temporarily vacated by the person going overseas cannot be filled on a tenure basis. This leads to stopgap measures such as more use of inexperienced graduate students, distribution of duties among other staff members, hiring of retirees, and delayed filling of positions. Many of these problems cannot be solved without more certainty of funding for international work, yet substantial gains can be made by more long-range planning in personnel management.

The return of a staff member also presents difficulties. Three-fourths of the animal science department heads indicated that adjusting staff loads and assignments when the staff member returns is a major problem. It also takes time for the returnee to readjust although there is disagreement on the severity of this problem. One-half of the returned animal scientists indicated that they had adjusted in one month or less, but only six percent of the department heads thought staff members adjusted this quickly. About 40 percent of the department heads thought that it takes longer than six months for staff members to make the adjustment; only 16 percent of the returnees thought it took this long.

In conclusion, there is ample evidence to indicate that the involvement of colleges of agriculture in international work has resulted in

significant cost to the ongoing activities. However, in interpreting these figures, it must be recognized that the number of staff members on foreign assignments has been a small proportion of the total personnel, so the gross effect on domestic programs is not as great as these figures suggest. Perhaps the most significant thing is the attitude toward international work that has been generated as a result of the personnel problems in the past.

Lack of professional status of international work. There appears to be a critical need within colleges of agriculture for developing professional respectability of international work. The reasons for this are complex. Research and the education of graduate students have received the most attention during the past two decades. Enrollment of undergraduate students in agriculture has declined in many of our colleges or at best increased only modestly in comparison with other colleges of the universities. We began our overseas activities with the misconception that we already had the technical knowledge to assist in solving the agricultural problems of the less developed world. Only recently has there been recognition of the need to undergird technical assistance with a solid research foundation. Also, many university people are still uncertain about the priority and nature of the research needs. Research at home has moved toward more and more specialization, while the nature of overseas assignments and the limited staffing of AID contract projects has called for the agriculturist to be more of a generalist than is considered desirable on the home campus. A substantial number of faculty members view international work as a geographical expansion of the domestic extension function. This view seems to be more widely held among animal scientists than those in other agricultural disciplines. Fifty-five percent of the animal science colleagues agreed with the statement: "Extension staff members can fill most AID contract positions more effectively than research and teaching staff members." The corresponding figure for all disciplines was 32 percent.

Nearly one-half of the animal science colleagues indicate that they would advise a person considering a foreign assignment that it is likely to detract from his professional advancement. This attitude undoubtedly stems, to some degree, from the commonly held opinion that universities have not staffed their overseas projects with high-caliber faculty members. A colleague who reviewed a draft of this paper bluntly expressed the idea in a marginal note: "Hot potato category: here I wonder if you don't need to point out that staff recruited for overseas work are not the 'best' — a terrible thing to say but how can you avoid this reality? We have sent second-raters. Does not this influence the 'respectability' of this career area?"

This attitude does influence the respectability of international work as viewed by the university community. But, I would argue there

is little to be gained by general comparisons between those who have served on foreign assignments and those who have not, particularly selected groups of the latter. Effectiveness in any type of work must be judged in terms of the goals of that work, and university goals in international work have generally been obscure, so that it is virtually impossible to judge effectiveness of groups or individuals in meaningful terms. Perhaps some individuals are being judged as "second-" or "third-raters" because the international work is judged by some to be of second or third priority.

Why do many within the ranks of the animal sciences look on international activities as a relatively low order of work? Are they not convinced that animal scientists have a significant contribution to make in the development of the less developed countries? Are there not research problems for animal scientists in these countries to challenge the best research minds? Is there not knowledge to be learned through research in different environments that will be both helpful to the less developed countries and useful in understanding biological questions that are important to our domestic problems? Or is it that animal scientists are discouraged by such oversimplified statements as, "Animals compete with humans for crops grown on the land," and the seemingly insurmountable obstacles presented by cultural relationships to animals in various parts of the world?

It is for animal scientists to develop consensus on such questions if international agricultural work is to find its place of respectability within the academic community. As long as many look on international work as being in a low order of priority, faculty members, and more important in the long view, graduate students will not be attracted to this work.

Disruption of careers. It is clear that international work cannot be respectable unless it is compatible with the career goals of the individuals within universities. The work done on foreign assignments must be relevant to a person's discipline and must be useful when he returns to his home university.

Those who have served on foreign assignments are strong supporters of international work and would be willing to accept another foreign assignment. However, many point out that they would be more thoughtful and discriminating in planning for what is to be done while overseas and after returning to the home campus. They would classify their first foreign assignment as a disruptive career interlude, though some are willing to accept one such interlude because of the experiences of working in a foreign country and because of the international travel benefits provided for themselves and their families. Professional considerations rise in relative importance for subsequent international participation.

Fifty percent of the animal science returnees indicate that a staff member finds it difficult to use the foreign experience on his job when he returns. Two-thirds of their colleagues and three-fourths of the department heads agree that this is a problem. All groups of animal scientists view this as a greater problem than do the other agricultural disciplines.

One gets some idea of how animal scientists view foreign assignments in the less developed countries from their responses to a comparison of these assignments with sabbatical leaves. Three-fourths of the animal science colleagues and two-thirds of the department heads agree that those who serve on AID contracts do not get as much benefit in developing their ability and skills as those who go overseas on sabbatical leaves. Again animal scientists have a less favorable view of AID contract experience than do the average of all disciplines.

At the same time, animal science department heads have a rather favorable view of AID contract experience as a means of contributing to the international dimension of the department's work, and they are stronger in this view than department heads from other disciplines. Yet, animal science colleagues view AID contract experience much less favorably than do animal science department heads.

Such responses suggest serious problems among animal scientists in developing a clear consensus on their role in international development and means of performing this role.

Education for international service. The all too prevalent attitude that foreign students are adequately served by the courses and curricula designed for Americans who will work in the United States is subject to more and more questioning. Likewise, there may be special needs for American students planning for a significant international dimension in their career. The highly specialized, one-discipline orientation may not be adequate. Heavy concentration on the biological sciences and agriculture may not be adequate for those who are to deal with development problems in a foreign economic, political, and cultural setting. Other speakers will deal with this in more detail.

Administrative problems. Administration of international work presents problems both at home and abroad that cannot be handled adequately through established administrative structures and routine procedures. This is particularly true if one is concerned about the professional career of the individual and the building of international work as an integral part of the program of the home departments.

One of the serious problems is the lack of ties between the overseas program and the university department program; the individual on foreign assignment practically undergoes professional isolation. Present practices are inadequate. For example, only six of 31 animal science

department heads indicated that the animal scientist on the overseas project was responsible to the department head. Twenty-one said that the overseas animal scientist was responsible either to the chief of the party overseas or to the AID contract administrator on the home campus — possibly to both. Only five of the animal science department heads indicated that they had primary responsibility for recruitment of faculty members for the overseas work. Half of the heads had not visited the overseas project on which animal scientists were serving. To the question, "Is there an individual or committee in your administrative unit responsible for providing information, materials, and advice to overseas staff members from your technical field?" 22 of the 31 heads responded, "No." This should be sufficient to point up the need for improved administrative and professional relationships between the person overseas and his colleagues, and between the overseas and departmental programs.

Lack of international experience of many department heads also presents some problems. At most universities the overseas project has not been given high enough priority to attract deparment heads for other than short-term assignments or as executive visitors. And, as pointed out earlier, many department heads in the animal sciences have not had the opportunity to serve even in short-term roles. Therefore, many department heads in all disciplines do not have adequate experience and knowledge of the overseas project and its environment to give the needed leadership to program coordination.

Overseas projects and related on-campus international involvements suffer from the "top-down" administration that has been all too characteristic of the past. This still continues in many universities, although most college-level and university-level administrators are aware of the problem. Department heads and their faculty members are critical of higher administration on this point. Many feel that higher administration is too prone to commit the institution to overseas projects without adequate faculty consideration of the matter. On the other hand, most department and college faculties are less than aggressive in making clear to administrative personnel the types of international activities that are compatible with their professional interests.

Many colleges of agriculture have designated personnel to give leadership to the international work. There is a great need for departments to consider how they can organize for the international dimension of their work and relate to college- and university-level administration, as well as to other departments.

Obscurity of goals and lack of commitment. It could be argued that the problems I have been discussing would largely disappear if we could only come to grips with the obscurity of goals and the lack of commitment. In short, we have not developed clear-cut ideas or a

strong consensus on the whys of our involvement in international work. This can be rationalized in terms of the history of our universities, where our experiences have been short-lived and have involved only a small proportion of our total resources. To a large degree, we have been responding to the needs of foreign countries as reflected through our federal government. In the process, significant contributions have been made and much valuable experience has been gained. But it is now 1969, not 1949. The university president who responded on behalf of the land-grant colleges to President Truman's call for help under Point IV is now Administrator of the Agency for International Development. The problem of providing technical assistance in agriculture now looms even larger than two decades ago. This calls for quality performance from the limited resources we have, for any prospects of expanded resources are likely to depend largely upon performance in the immediate future.

It is not my purpose to make a plea for more resources. Important as this is, more fundamental is the need for university personnel at all levels, particularly faculty members, to develop the rationale for our international work. This involves specification of objectives and goals and clarification of why they are important. A higher degree of commitment to the task than is presently the case in most colleges of agriculture is called for. What is meant by commitment? Perhaps the following description of a committed university will clarify (*1*, pp. 82-84):

1. The university is interested in developing its stature in the international area and recognizes international work as a legitimate concern of the university deserving added resources.

2. Faculty members are involved in an organized way in major policy decisions on international work. The decision to enter a new program is made only after consideration by faculty members as well as administrators . . .

3. On-campus personnel are actively engaged in determining policies and strategies for the university's contribution to overseas projects . . .

4. International work is an integral part of the work of the departments. Department administrators are actively involved in overseas program planning and personnel management in their discipline. Overseas experience is looked on as contributing to professional growth of the individual. Faculty members and graduate students, both domestic and foreign, have the opportunity to pursue research on international problems. Department heads have international experience gained through a combination of long- and short-term assignments and executive visits.

5. There is an administrative organization to give leadership in the international area with effective means of communication among faculty members and among administrators at different levels — university, college, department — and across departmental lines. International program administrators are sensitive not only to the needs of the overseas program and personnel but also to the requirements for building university long-range competence in international areas.

6. Faculty members who have returned from overseas assignments are using their experience to build university programs and competence in the international area. There is an organized and continuing program for soliciting the ideas of returned faculty members for improvement of both overseas and on-campus programs.

7. University personnel policies encourage faculty members to accept foreign assignments with assurance that their positions with respect to rank promotion, salary, position upon return, and fringe benefits are not jeopardized. Staff members on foreign assignment are viewed by administrators and colleagues as continuing members of their university administrative units, *not* "on leave with AID."

This list could be expanded; nevertheless, I think it serves as a useful set of criteria to be used as the basis for testing the degree of commitment to international work.

How can the obscurity of goals be reduced? This calls for development of definite criteria for determining what is appropriate for the universities to be doing. How does international work fit in with objectives for research, undergraduate and graduate instruction, and public service? Different universities may respond with different answers. At the college and department levels, thinking in terms of department programs and the professional goals of individuals needs to be more specific. The following broad guidelines are suggested to serve as general criteria for judging the appropriateness of an overseas developmental project (*1*, pp. 85-86):

1. The project should serve the needs of the host country or host institution, but this alone is not a sufficient condition for U.S. university participation.

2. The universities should have strength in the areas or disciplines in which the work is to be done.

3. The program of the overseas project should complement the domestic programs of the discipline-oriented university departments involved.

4. The project should show potential of adding to the stature of the U.S. university. Obviously, to do this, overseas work should be consistent with the objectives and goals that those who support the university and serve on its faculty and staff expect it to attain.

5. The project should provide for university faculty study and research, thereby increasing the knowledge base of the university and enabling faculty members to gain in professional competence and to gain recognition among their professional peers.

6. The work to be done should be of such significance and in an environment that permits university faculty members who participate in the project to advance professionally both during and after the overseas assignment.

7. The project, its environment, and library and communication facilities should permit the U.S. university faculty member to stay in communication with his colleagues in the university and the wider scientific community.

Most of the problems faced by animal scientists in their international concerns are not unique. But they will not be resolved without serious tension. Approaching, if not fully attaining, solutions presents opportunities for greater service in education and research.

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Observations on the Development of an Animal Science Faculty

W. L. Johnson

The principal goal of a developing academic department of animal husbandry should be, I believe, attainment of the capacity to fulfill these two functions:

1. To serve as the generator, guardian, and transmitter of the knowledge and techniques necessary to maintain efficient production levels in the livestock industry.
2. To exercise catalytic leadership in the organization of resources to meet existing needs for domestically produced livestock products.

The underlying motivating forces in meeting this goal should be service to the rural community by promoting increased income levels, as emphasized in the CIC-AID report (*1*) and service to society as a whole by meeting food needs and increasing dietary quality. This must be done in the context of the natural, social, and economic environment in which the institution is located, with the realization that total economic development depends on growth in the agricultural sector. This in turn depends on adapted and new knowledge.

Adequate buildings and laboratories, a well-trained staff, a well-stocked library, and a healthy operating budget are all important aspects of the agricultural university's capacity to reach its goals. These items, of course, are not in themselves the principle objectives, but rather they are the essential tools a department must have to do its work.

Characteristics of an animal science department in the process of development

Next let us review some of the salient features of an academic institution that is still somewhere down the ladder and climbing, hopefully, toward its goal of maturity. It is always dangerous to generalize, for some of the items may vary in different countries or regions due to historical or other factors. For example, some universities in these countries boast a long and proud tradition, while others are literally still being carved out of virgin jungle. Some have recently been elevated from a long-standing agricultural high school status to universities with research and even graduate education functions. Others, such as the Peruvian Agrarian University at La Molina, have traditionally offered

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a general college curriculum in agriculture but have only recently established major fields in the animal sciences. In still other situations, animal husbandry education has traditionally been a by-product of the veterinary faculties and is only beginning to come into its own as a discipline (*2*).

Many problems confront the faculty of animal science in a developing country. For example, the number of students often far exceeds classroom and laboratory capacity; students may arrive from secondary schools or even from basic college courses with an inadequate background in mathematics, basic sciences, or language skills. The physical plant may be ancient and poorly maintained, except on campuses where foreign capital has helped finance new construction programs. The productivity of the department's herds and flocks is often considerably lower than that achieved by the more progressive private livestock producers — a situation hardly appropriate for an institution assuming a leadership role. Some factions of the faculty may resist innovations suggested by younger men with better training. Or the few men adequately trained for research may have been thrust into administrative positions with little time left to pursue their research interests.

The newly arrived visiting U.S. professor may consider such problems as overwhelmingly formidable. However, the observer who can compare the present state of development with what existed a decade or so ago may see more cause for optimism than one who knows only what it was like back home. Progress may, in point of fact, be occurring at a faster rate than in the earlier days of our own universities.

Such progress as has occurred may seem quite unbalanced, but this should not be surprising if we consider the many areas that need attention and the relative lack of resources to do the job. Evidences of such unbalanced growth include the following:

1. An undue percentage of the annual operating budget goes to salaries, with little left over for teaching materials and virtually nothing for research. Even so, the salaries themselves may be dismally low.

2. A large proportion of staff positions may be occupied by young and relatively inexperienced persons who are very recent graduates of the university they now serve.

3. A large percentage of the faculty is abroad with study grants. This creates a manpower squeeze, but this seems to be a necessary sacrifice for the long-term upgrading of the faculty.

4. Some disciplines or sections of the department receive more attention and develop faster than others, often because one or a few outstanding individuals have training, ability, and vision beyond the rest of the department. The field of animal nutrition generally leads

such other disciplines as breeding and physiology, perhaps because nutritional problems are the most obvious or perhaps because the principles of a balanced and adequate diet are more easily adapted to a new environment.

5. Graduate degrees, even Ph.D.'s, may be offered in some fields, while in other fields undergraduate training is still unsatisfactory.

These comments are intended to be descriptive, not critical. A completely balanced growth is impossible to achieve and is probably not even desirable. It is as logical for a university to forge ahead in the areas of its strength as it is for an entire developing economy to do likewise, confident that other areas will catch up even faster as the fruits of accomplishment are realized.

Interactions between a department of animal science and the developing economy

To understand fully the limits and demands placed upon an academic institution in a developing country, its role must be seen in relation to the state of development of the nation it serves. There are two aspects of this relationship: The institution must accept certain limitations imposed by the educational and economic climate in which it finds itself, and at the same time it must be prepared to meet certain challenges about which it alone has the capacity to do something.

The limitations include such varied items as the previously mentioned educational background of incoming students; the limited tax base and resulting inadequate financing of all government programs, including higher education; the competition with government and private industry for trained personnel; the lack of effective channels through which to communicate the university's knowledge; and, in cases where producers can be reached and persuaded to try a new idea, the lack of complementary inputs — credit, feed supplements, seeds or fertilizers, and marketing facilities — to make the new idea work.

On the other hand, the university may accept additional responsibilities such as giving technical advice for program planning and implementation to government agencies that lack their own specialists, and serving as a direct source of information for producers who have no other satisfactory place to turn to for technical advice. The university may likewise be called upon to lead the way in certain activities that normally belong to private enterprise. These activities include so-called pilot projects in some area of production, processing, or marketing that may take on the scale of a commercial operation and therefore seem incompatible with the traditional concept of a university's function. However, if such activities fill a real national need, if the result is experience gained or new techniques perfected, and if

the spirit is one of demonstration to the private or government sectors so as to complement their activities rather than compete with them, then I believe a liberal and imaginative viewpoint should be taken about what sorts of things are or are not the legitimate function of a university.

Relationships with counterpart departments in U.S. universities

The kinds of cooperative programs with U.S. universities which might be beneficial to the developing animal science faculty may vary as different stages of development are reached. It is worth noting that the decision to invite participation with a foreign university implies that an institution has reached a certain crossroads in its development. This step is often accompanied by the desire and commitment to improve the undergraduate curriculum, place increased emphasis on research, or initiate a graduate education program.

Visiting professors often have useful suggestions for improving undergraduate curricula. Problems in this area include inflexible course requirements that leave little room for electives, the need for updating syllabuses, and an appalling lack of textbook resources. Textbooks adapted for local conditions often just do not exist, but even when a reasonably appropriate one can be identified, there may be no satisfactory arrangements to make it available for all students. Textbook rental schemes are only beginning to fill this void.

When research becomes recognized as an integral part of a department's program, there is plenty to be gained from experienced scientists from abroad. Even where local staff members have adequate training for the job, either there are not enough of them or a disproportionate share of their time is tied up with administrative functions. The following activities by the foreigner are appropriate at this point:

1. Designing laboratories and ordering equipment.
2. Giving advice in experimental design and data interpretation.
3. Providing examples of how to plan and implement a research project that is directed toward solving a locally important problem.
4. Assisting in plans for a systematic staff upgrading program, taking into account the needed specialties and where best to send graduate degree candidates.
5. Easing the re-entry of returned staff members, with material support and assistance in finding appropriate practical directions for their research efforts.

As graduate education begins to receive emphasis, the foreign visiting professor can help plan and teach graduate courses and seminars and supervise thesis projects. A currently popular procedure is for graduate students, American or national, to undertake thesis

research at the developing institution under the supervision of visiting professors from the U.S. university. This procedure is desirable in that a national student, after completing a solid program of course work in the United States, can become involved in a research topic of local importance which he most likely will continue after receiving his degree. Furthermore, such projects stand as examples to local graduate students who can learn much about research procedures and work habits by working side by side with the student who has trained for several years in the States.

Future challenges

The CIC-AID report emphasized providing continuity to institution building efforts. We need to be more imaginative on this score, making it attractive for our best people to stick with a program for much longer than the usual two-year contract. North Carolina State University is currently experimenting with a "campus cooperator" concept: A returned professor is given a series of further short-term assignments over an indefinite period, during which he carries one or two steps further a project that was initiated during his original assignment and now is being supervised by local personnel.

A second challenge is the need to persuade local government leaders that research can be a productive activity. This is another aspect of institutional maturity — development of the domestic constituency necessary to assure adequate continued financial support. It is necessary to show that practical answers to real problems can be obtained through well-conceived and well-executed research. Such demonstrations, particularly in the animal field, may require a long-term effort that is incompatible with a goal of "instant results."

Another challenge is the promotion of two-way communication between university personnel and the private producer. This is more difficult, but by no means impossible, when the extension organization is completely separate from the university. New approaches must be sought, including continuing education programs for extension personnel or for leading farmers; emphasis on the development of extension materials such as leaflets, bulletins, and visual aids; and the appointment of extension subject matter specialists who are part of the faculty but whose responsibilty is to maintain an outward flow of information, while keeping alert to field problems that require research attention.

We also need to think about the molding of an appropriate relationship between the "mature" faculty in a developing country, which will by then be able to meet its responsibilities with its own manpower and financial resources, and the U.S. university department, which will have added a permanent international dimension to its activities. In our

fast-shrinking world, where the farthest point will be only a few hours away by supersonic jetliner and communications will be instantaneous, surely mutually beneficial cooperative programs can be structured. Some steps have been taken in this direction, for example, with reciprocal visiting professors. A true partnership with equal responsibility should be the ultimate goal, and any opportunity to move in this direction should be welcomed.

Another challenge will be to define the role of the U.S. university in relation to the international agricultural research and training institute, as this type of institution assumes more of the responsibility for basic and applied research in the physical environment common to developing nations. The International Center for Tropical Agriculture (CIAT) in Colombia, in its plans for research on animals, particularly beef cattle, will investigate problems common to much of tropical Latin America. How can animal science departments in U.S. and Latin American universities best cooperate with the CIAT program? Two suggestions that come to mind are to recommend trainees for Colombia and to serve as a link in the communication and application of CIAT-generated information.

One advantage that a developing institution has is the opportunity for innovation in its efforts to meet the many challenges facing it. A complete departure from traditional methods may be called for, and the visiting specialist needs to be receptive to imaginative ideas that may not necessarily conform to "how we did it back home."

Much is known about the magnitude of the world's food supply problems for the next decades, and awareness of the kind of effort necessary to solve these problems is growing. The big question is whether there exists the will to make the organizational and financial commitment that must be made. The tremendous strides in the space program over just one decade stand as proof that men working together can develop a new technology and apply it to solve a specific problem, where there are the will and the commitment. Let's hope that we can now succeed in consolidating the real gains of the last two decades and make solid progress toward increasing productivity of the livestock industry in developing nations.

The Problems of Adjustment to Cultural Differences for Effective Education

C. C. Sheppard

We have problems dealing with other educational systems and other cultures. Most of our experience has been with our educational system in the United States, which generally has developed through universities that adhere to the land-grant philosophy and the land-grant system.

It seems to me that we have confused the land-grant philosophy with the land-grant system. The land-grant philosophy, as I would define it, means educating people to do a better job, to live a better life, and to have a better understanding of their world. The land-grant system, however, is an American device for performing research, teaching, and extension under the dean of the college of agriculture in the state within which the college operates.

Other countries typically do not operate under the land-grant system. Research and extension services are supervised by the Ministry of Agriculture, while the colleges and universities are usually operated by the Ministry of Education. This division means that most Americans in programs overseas will have to adjust their thinking about how to do extension and research as they help with courses of instruction.

Research

Research is an important part of any educational program, here or abroad. Many people who go overseas on projects want to do some research. This is fine as long as they select a suitable research objective. In Colombia, I "proved" that feed produced in the United States would grow better broilers than feed composed of local feedstuffs. Therefore, I told the students they could not expect to do a good job unless they bought the feed from the United States. I was not working with them in their culture with their products; I was transplanting part of the United States into a different culture.

I saw three U.S. technicians researching the same problem. One had developed a very intensive form of cultivation; the second had developed a very extensive form of cultivation; the third was doing nothing. The first technician had been raised in the West where things are done in a big way over large acreages. The second had been raised in the East where things are done in a big way on small acreages. The third was having administrative problems. Surely we can agree that

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when researchers are working out of the same location, though not necessarily on the same contract, there ought to be coordination.

There are also physical problems in overseas research. How do you mix feed, hatch eggs, operate a heat lamp, run a battery brooder, or get water pressure where there is no electricity? If you use electrically operated equipment in your research, how do your students translate these operations out in the countryside where there is no electricity?

Good research can produce problems. We ran a demonstration trial with calves where the usual mortality rate was 50 percent during their first year — commonly from pneumonia, bronchitis, etc. After nine months of various treatments, only three of the 24 treated calves had died, while 50 percent of the untreated ones had died. The local farm manager started treating all of the calves immediately. Six months later he said, "I have a problem. What do you do with all the calves?" He had no market outlet, for no one eats veal in that country. In the five years it would take for the calves to develop into marketable cattle, this man's milk cows were going to produce even more calves. Treatment for disease was going to require quite an adjustment in his thinking, his management program, and his land use. We cannot transfer only a part of our technology into other societies without causing some serious problems.

Occasionally research is misapplied. I was once asked to review a paper on the application of sprinkler irrigation water to selected crops. This was written by a host country representative — a counterpart — who had just returned to his home country with a Ph.D. in economics from Harvard. He displayed genuine cultural confusion: None of the selected crops in this particular article were native to his country, and there was only one sprinkler irrigation system in his country — on the university research farm. The article was beautifully done; it was well reported; you would have been proud to see the statistics he used. Unfortunately, more than 99 percent of the people for whom it was supposedly intended could not understand it.

One "two-week wonder" visited us in one of our overseas trips. He looked around and said, "All you have to do is plant this whole area in corn. You can then feed it to your livestock, and your protein problems will be solved." I don't believe he understood the problem; I don't believe the local people are that dumb. If what he recommended were the only thing necessary, I'm sure they would have figured that out long ago.

I would ask, does your research apply? Will it help the developing country? Do you understand the country's problems?

If we are going to do research overseas we must change our whole approach. In the United States we often perform research to further ourselves as individuals — a procedure not unrelated to the idea of

"publish or perish." Many of us concentrate on basic research. Research done overseas, however, should have immediate applications within the host country. The developing countries seldom have the time or money available to divert from applied to basic research. An overseas researcher should ask himself whether what he is doing is really applicable at this time in the particular society he is supposedly trying to help.

Teaching

The problem of teaching overseas is also worrisome. I have been told that one teaches 90 percent as he has been taught. If this is so, most of what we teach overseas is not applicable.

Recently an agricultural engineer was discussing how he taught his overseas students the proper time to service an aircleaner. Unfortunately, there are usually no aircleaners to service. There are lots of oxen, horses, donkeys, and men — and they come equipped with their own self-cleaning aircleaners.

A common course given in the United States is "Farm Power and Machinery." How do you teach it in a region where the farm power is a man and the machinery is a hoe?

You may be talking about fertilizers, milk cows, methods of feeding chickens and producing good beef, and so forth. The only problem is, the students have never seen fertilizer, milked a cow, fed chickens or eaten eggs, tasted good beef, or handled livestock. You must ask yourself if you really have anything to teach or if you are missing the point. Are you talking about corn, alfalfa, silage, chickens, cattle, and acres in a country that has peanuts, yams, cassava, bananas, goats, sheep, jungle fowl, and hectares?

A training program or an educational system must certainly include a work-study program. In my opinion, it must be very closely supervised *at the university by the people who are doing the teaching.* This will probably produce fewer students but much better ones.

Extension

I am not sure what extension really is in overseas work. It seems to have much to do with demonstration teaching. I am bothered by some of our procedures in overseas animal agriculture. We tend to ask for and get demonstrations we can set up easily, without asking whether they can be used.

Consider the development of a dairy farm. No one seems to question why one is needed — we must have a dairy farm! I want it, the vice-chancellor wants it, the dean of agriculture wants it, the Ministry of Agriculture wants it, and those are reasons enough. The trouble is, there is no processing, no marketing, no demand. That is, there is a demand — from U.S. technicians and the faculty. There is seldom

consideration of whether the dairy farm is to be a fringe benefit at the university at the expense of a really meaningful program someplace else.

Next, we must have an artificial bull stud. Everybody knows you make lots of progress with artificial insemination. Like the dairy farm, such a program can be developed without a shadow of a doubt. But there are problems. What good is the program in a country without cows? If there are cows, how do you get the semen to them when they need it, when there are no phones and only jungle trails or mountain pathways from you to them?

Next, we must have better livestock. So we introduce Holstein, White Leghorns, Zebu, or Brahmas while ignoring the native cattle, sheep, chickens, and goats. We always seem to despise sheep, goats, little runty cows, and chickens — yet we call ourselves livestock specialists!

We so often undertake overseas projects without asking whether a certain plan should be carried out at all. What is the plan's purpose, and how can we best accomplish that purpose? A host country asked us to send a poultry expert to develop a commercial poultry industry. We were told that the purpose of the program was to produce low-cost protein for the masses; but what did it in fact accomplish? It produced low-cost eggs for the rich U.S. technicians, local business people, and upper echelon government servants. It also produced quite a few jobs — which may be an important reason for the program. But it did this at the expense of many dollars and quite a lot of time of highly trained local as well as outside technical help.

Is it our responsibility to give developing countries what they want or what they need?

Conclusion

In conclusion, if you are contemplating an overseas program:

1. Can you relate to the conditions, products, and culture of the host country?

2. Are you a specialist or a generalist? If the job takes a nutritionist, a market specialist, a geneticist, and an economist, you are the only person there to get the job done.

3. Are you considering the program for the sake of having an overseas program, or will it really do some good for the host country?

4. Does what you have to offer fit their society? Are you familiar with the animals they know and use?

5. Does your research help you or the host country?

6. What will you do with 20 head of beef cattle (12,000 lb. of meat) or 30 milk cows (1,200 lb. of milk) in a country that has no refrigeration? Can you adjust from our technology to what is available in the host country?

The Graduate Education of Foreign Students in American Universities for Effective Service to Their Home Countries

Lee M. Swan

In this paper I shall focus on three basic efforts. First, I shall very briefly discuss general educational methodology. Second, I shall look at some research on foreign student education. Finally, I shall suggest some guidelines which, if implemented, would make our graduate programs for foreign students more effective. Effectiveness can be measured in terms of professional productivity and interpersonal relationships — taking into account, of course, home country environmental factors which may either enhance or limit the student's efforts upon return from his sojourn.

Implications of educational methodology

A review of social science research and literature produces many findings relevant to educational methodology. As a framework for discussing the most pertinent research, let us consider several questions.

First, how does an individual learn? Research (*1*) has shown that in perception of things, a person tends to confer on what is perceived more than its mere physical characteristics: form, configuration, and meaning are given to the object.

The Gestalt-Field psychologists (*2*) propose that learning is facilitated when what is to be learned fits into a "whole," or into the "life space" of the individual, rather than being an isolated entity. The philosopher John Dewey (*3*) continually emphasized the necessity of relating education to the actual life experiences of the individual. According to Dewey, a "taking up of something from the past" was one of the requisites of a meaningful educational experience.

One of the definite challenges in educating foreign students is to relate the educational experience to the "life space" of the student.

Second, what influences an individual's behavior? This question assumes that individuals do not just behave randomly. Sociologists submit that, in outline, a person's behavior is a function of his role and his personality. Any institution with which an individual holds a position defines certain roles and related expectations of performance.

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At the same time, the individual has a number of unique "need-dispositions," or motivational factors within his personality structure. The interaction of these two forces produces the observed behavior of the individual. If the two forces are in harmony, the worker will likely be productive and happy; on the other hand, discord and ineffectiveness will likely result if there is serious conflict between the role expectations of the institution and the need-dispositions of the individual.

The foreign student holds a number of different roles which must be considered in the educational process.

Third, how can we most effectively bring about change in opinions, attitudes, and actions of individuals and groups? There is strong evidence that merely lecturing to people does not cause change in them most effectively; rather, the important variable seems to be the degree to which an individual or group can be genuinely involved and committed to new behavior.

During World War II American women were encouraged to use animal viscera in their cooking because of the limited meat supply. The problem was how to make the use of hearts, kidneys, and so forth, acceptable. In an experiment, several groups of women were given attractive lectures while other groups had structured group discussions. At the end of the discussion group sessions, members were requested to indicate publicly their intended actions. It was found out later that only 3 percent of the lecture group individuals actually used animal viscera, while 32 percent of the women in the "discussion and decision" groups did adopt the new practice (*4*).

Also to be considered is the extent to which the individual whom we want to change can be involved in trying to convince others of the desirability of the change. As he talks to others, he himself becomes convinced of the positive features of the new action.

There is a need to involve the foreign student in the educational process and solicit commitments from him to new ideas.

Research on foreign students

Findings from selected foreign student research are conveniently grouped under five headings.

1. *Patterns of adjustment.* Most studies have found that foreign students typically pass through phases of adjustment during their sojourn. Initially the student is a spectator: He's excited about his new environment and the opportunity to study abroad. However, as he becomes more intimately involved in interpersonal relationships, possibly six to eighteen months later, he may become confused as to what is appropriate behavior, and he experiences frustration. Hopefully, he will successfully pass through this stage, and his morale will rise again as he "comes to terms" with reality (*5*).

2. *Status loss in sojourn.* The attitude of the foreign student toward the host culture has an influence on the effectiveness of the educational experience. The relative deprivation or gratification the visitor experiences in his national status — and thus in his implied self-status — during his sojourn strongly affects his attitudes toward the host culture (*6*).

"Implied status loss" occurs when the foreign student feels that those with whom he interacts ascribe lower status to his home country than he does. If the student feels such status loss, it will negatively influence his perceptions and attitudes toward the host culture.

Status loss could easily develop in the following situation. Professor X is having his first discussion with his new graduate student in dairy science from Kenya, East Africa. In the course of the session Professor X indicates amazement upon learning that any European stock exist in Kenya; he asks if any corn is raised within the country; and he asks how the Mau Mau situation is now. Professor X has told his advisee something about his knowledge of Kenyan agriculture and politics. Lack of knowledge about the home country is an affront to the student. Likely the Kenyan will feel that his nation has low status in the eyes of his professor, and thus he infers that his own status is low. The relative status we ascribe to other countries can come through to students in much more subtle ways than suggested here.

3. *Institutional pressures on the foreign student.* Some recent research has concentrated on the "student" role of the foreign student rather than the "foreign" aspect (*7*). This is reasonable since the foreign student's overriding concern is to receive academic and professional training to the exclusion of every other consideration. It has been shown that the university, or more important, the professor exerts a tremendous influence on the student's perception of and interaction with other aspects of university and American life. The student sees his aims and aspirations in the hands of the faculty and feels at the mercy of the particular university setting. Home-country expectations also place great pressure on the student to complete his academic goals. The student feels that, to achieve his goals, he must "run the course," no matter what obstacles he faces.

4. *Background factors influencing effectiveness.* Some foreign students have certain advantages that help them to successfully complete and utilize their graduate experiences. The Agency for International Development conducted a study to evaluate its participant training program and found that 38 percent of the returned participants could be classified as "very high" utilizers of the training received in the United States (*8*). The study concluded that greater utilization correlated with the more professionalized fields of training, such as agriculture, health, and education; programs of longer duration; an active involvement by

the home-country supervisor in selecting and programming participants; satisfaction of the participant with the training program; and programs that the returned participants believed to have contributed to career enhancement.

The maturity of the individual and the amount of work experience he had prior to his sojourn also seem to affect the use he makes of his overseas experience (*9*).

5. *Consensus among student, professor, and home-country employer.* Students, their major professors, and home-country authorities (potential employers, supervisors, and colleagues) should have similar attitudes toward and perceptions of American graduate education for foreign students. I have conducted interviews (*10*) with Filipinos in each of the three groups named and have found that those students whose concepts most closely matched the concepts of the professors and the authorities tended to be most satisfied and to perform best in their graduate programs. There was a positive relationship between consensus on objectives and the dependent variables of satisfaction and performance. We have no evidence yet to point to any relationship between this consensus and effectiveness of programs where the criterion is home-country performance, though this is the next phase in our study.

Proposals for implementing effective foreign student graduate programs

I submit that the following proposals should be considered if we are to maximize the possibility of offering the foreign student a meaningful graduate experience, as judged by his effectiveness within the home country.

1. *The professor advising the student should have knowledge of, and a sense of familiarity with, the home-country agricultural, socioeconomic, and political systems.* Implementing this proposal would go a long way in detering status loss for the foreign student. Few other efforts could be more effective in assuring the foreign student that his country has importance than to have a major professor who is knowledgeable about the student's country and who expresses an interest in learning more. Such a professor could also help ease the initial uncertainty the student feels in a new environment. Most important, the student with a knowledgeable professor will have obvious programming advantages.

2. *The major professor should make a special effort to maintain close contact with the student during the first year of the sojourn.* Unfortunately, before the student becomes involved in research there is normally very limited contact between the major professor and a

foreign student. The student, however, may experience his greatest difficulties during the first year. He will need support, and his major professor is the primary individual to whom the student looks.

In regard to these first two proposals, I believe there would be advantages in having "international professors" within academic divisions, or across similar departments, who would advise foreign students for at least the first year. For example, if within the animal departments we had one professor who was knowledgeable about Asia, one about Africa, and another about Latin America, each could serve as at least a co-advisor to students from the related geographical area.

3. *In addition to traditional criteria for admission to study, special attention should be given to the maturity and work experience of the student.* A mature individual, as well as one who has worked before or has a position waiting for him at home, will more likely be in an educationally advantageous position. In my study (*10*), those students with over three and one-half years of work experience were significantly more interested in orienting the graduate program to the home-country situation, than were the students with less experience.

4. *The student and appropriate home-country authorities should be sincerely involved in planning and implementing a program of study.* A more suitable program should result if both of these parties are consulted. If a program of study cannot be developed to meet all expectations, at least all parties will be cognizant of the possible outcomes from the beginning.

The student who helps plan a program acquires a sense of involvement and builds a sense of commitment to the program. The commitment not only fosters more positive attitudes but also, perhaps, a better learning experience.

5. *Appropriate non-academic experiences should be planned and deliberately built into the program in the initial planning stages of the program.* Non-academic or field experiences can play an important role in the educational program for a foreign student. They may offer the student an opportunity to gain certain practical experiences he may need, help him become familiar with important factors in our agricultural development, and provide a change of pace from graduate study. However, these non-academic experiences will occur very infrequently if they are not planned with the student as he *enters* graduate study. He'll often resist if he sees them as "something extra" that happens to come along.

6. *Special efforts should be made to involve non-university financed students in departmental activities.* In our study of Filipino students, it seemed that many of the students sponsored by other than university assistantships felt a lack of involvement in departmental activities and

the professors' professional interests. If all students could be involved in carefully selected research activities, this would benefit each one and generally make each feel like an integral part of the department.

7. *The student should be continually reminded of the professional realities within his home country.* According to our study, those students who had been in the states three and one-half years or longer were significantly less concerned about orienting their graduate study to the home-country situation. The student needs help to keep his focus on the home-country environment and the kinds of tasks awaiting him.

8. *Research problems and "hardware" should be similar to those in the home country.* We seem to be in a period of overselling the advantages of doing research within the home country. Doing research at home does not in itself assure that the research will be any more applicable to home-country problems or that the findings will be any more significant. At the same time, though, we have a serious problem with our present practice of merely "plugging in" a student into one of our ongoing research problems or interests. We must find a way to make the research problems and tools more applicable to the realities the student will face when he returns home.

This is the one proposal that definitely requires additional funds to implement.

9. *Courses and seminars relevant to the general home-country environment should be available to the student within his major field of study.* If some of the previous proposals were adopted, we would indeed be giving some special home-country orientation to the foreign student program; yet in my opinion this is not enough. The foreign student needs some special courses and seminars within his major field that are closely relevant to the home-country environment. In many fields there are already staff members qualified to teach such courses.

This proposal would not only help the foreign students, it would also add quality to all our academic offerings for all students. We've been too provincial within agriculture too long. Our domestic students will face challenges and fill roles that in the course of their lives will go well beyond the borders of our country.

10. *Special seminars in administration, leadership, and social change should be provided.* While we may have increased some students' technical competence, it appears that in all academic fields we have done a poor job at increasing interpersonal competence. There is little doubt that a large percent of the foreign students we're advising are eventually going to have positions of administrative responsibility in their home country, or at least will serve in roles of leadership and as agents of change. Yet I doubt that the students sense this. Only one of the 113 students in our study said he planned to go into administration, yet 38 percent of the home-country authority group were in administration.

11. *There should be follow-up and contact maintained with the student upon his return home.* Follow-up and continued contact can help us assess our graduate programs; just as important, such policies can give the student moral support and professional assistance in facing the challenges and frustrations at home.

* * *

Your reaction at this point is likely, "How can we do it all?" Certainly, it will take a longer period of study — as it should for any student, domestic or foreign, to whom we're trying to give a "special" experience because of his uniqueness. I don't think the preceding proposals are contradictory to what we should be doing with all students. Hopefully, we're using some sound educational principles in our graduate programs, orienting the study to the unique needs of the student, and following through to help him utilize the new skills and behaviors acquired. I hope you will give these proposals consideration and implement those that are meaningful and helpful to you and your foreign student advisees.

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Problems of the Returnee in Effective Use of American Education

J. K. Loosli

The main, immediate objective of higher education in animal science is to train people to serve the livestock industry of a country, directly or indirectly. America's contribution to the development of animal industries in emerging nations can be greatest by helping to train leaders to serve their countries in education, research, extension, and the planning of national programs. We should provide the kind of training that will give the greatest value when a student returns to his home country.

My title implies that serious problems have been encountered when students from the emerging countries have returned home after having been trained in the United States. We might ask, however, whether these problems would be any different if the students had been trained in Europe. And if American education is not used effectively, does the fault rest on the type or quality of education, on the trainee, on his institution and its administrators, or on the cultural and social systems of his native area?

Some of the problems a returnee experiences may be related to his training. There may have been uncertainty regarding what he was being trained for, or his teachers may have been unable to arrange training adapted to his specific needs. Other problems may involve salaries, grades of positions, duties and responsibilities, facilities, and funds for equipment, supplies, and technically competent assistants.

Is American education adequate and appropriate?

I believe that the education foreign students have obtained in America during the past decade has usually been at least as good as they could have obtained elsewhere and in some cases better. Results would be expected to vary with the background and experience of the student.

In the Philippines, I have observed American-trained staff members working in the same department with others who had received in-service training at research institutes in the United Kingdom. While meaningful quantitative comparisons are difficult to make, both groups seem to have experienced the same set of problems and to have reacted in similar ways. Men in the latter group now feel the need for an American degree, but this may reflect the pressure of the system more than a

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specific need. There seems to be a problem of deciding when a person is adequately trained so that he continues to learn and improve under his own incentives and is able to transfer this spark to his students and associates.

There have been improvements in American programs for training foreign students in recent years, though others are needed. Over the past 40 years foreign nationals, both undergraduate and graduate students, who have come to Cornell University for education in animal science have been required to fit into the same classes, laboratory exercises, and examinations as American students. They have learned about our breeds of livestock, our feeds, our housing and management practices, and our marketing systems. It has been only during the last 15 years or so that our staff members have had enough experience in foreign countries to know what the problems are, much less to suggest solutions. Most of the younger teachers do not have first hand knowledge of livestock production in other countries. As a result the applied courses have not always been meaningful to students from developing countries. A different assortment of courses is needed for the foreign student than for American farm boys. This does not imply a second class education for the foreign student but rather a selection of courses that provide the breadth of experience needed for him to serve his home institution and country effectively.

The best training program involves a strong foundation in basic science courses, a minimum number of applied courses on techniques, some work experience where needed, and a thesis research program on an important local problem — either at the student's home institution or in a similar environment where adequate staff and facilities are available (*1*). If properly carried out, such a plan may help to key the instruction to the solution of a defined problem. It could insure at least minimum facilities, equipment, support funds, and personnel to get the trainee launched on a productive research program and help develop a pattern of activities that could be continued. Such a plan would help to avoid the often heard criticism that a foreign student may spend several years making routine observations for his major professor on research bearing no relationship to what the student can do when he returns home and using scientific instruments he may never be able to afford. This plan may shorten the time a trainee spends away from home and so help to avoid the serious readaptation problems that arise when students are out of their home environment for more than two or three years at a time. It may, however, extend the time required to complete the Ph.D. It should be recognized, of course, that many research problems cannot be effectively studied in developing countries, and that facilities and trained personnel are often not available. There is clearly no easy answer to the problem of training an animal scientist

so that he can keep up with scientific advances for the next three decades or longer while he remains practical enough to be able and willing to solve current problems using simple methods and improvised equipment. We have the same problem with some American students.

Problems related to local institutions

Many of the problems returnees experience are so closely tied to local institutions and customs that it may seem that no solutions are possible without changing the institutions or customs. Usually the individual either moves out or adjusts so that he feels there is no longer a problem even though nothing has changed but himself.

Certain problems often trouble returning students. (*a*) A returnee must resume teaching beginning courses, and he does not have time (or students) for the high-level graduate courses he would like to plan. (*b*) His salary is little or no higher than when he left and he can no longer afford items that all American graduate students had. (*c*) After the first happy welcome home, his views are not always accepted and he may not be afforded the prestige and respect his Ph.D. justifies. This can be particularly serious if any of the trainee's peers have been advanced in rank while the trainee has been on leave to study. (*d*) Advancement of a trainee either in salary or responsibility too soon after his return may cause dissatisfaction among associates in the department. (*e*) He usually faces a lack of funds for equipment and operating expenses; inadequate offices, laboratories, libraries, and animal supplies; and a lack of competent technical assistance for research.

These problems, by no means exhaustively listed, are closely associated with levels of local financial support, administrative policies, and interactions with associates in all levels of work and community activities. Outstanding students usually do not experience any of the problems listed; when they do, the problems are promptly resolved and do not handicap the teaching or research programs. In general the better the student, the fewer the problems he is likely to have in readjusting when he returns home and starts to apply his education.

It is impossible to overemphasize the great importance of local financial support and total commitment to the success of any educational endeavor. Too many places are happy to build and to hire personnel by using foreign aid or foundation funds but are unable to gain local support for a permanent commitment to assure continued effective service from the institution. Animal scientists should realize that sound growth comes slowly, and only with years of patient work can a top level university or an efficient livestock industry be developed. Returning students should be aware that many of their problems cannot be prevented until effective institutions have been developed in their home countries. This will take time as well as trained people.

These guides for training the graduate student can minimize problems and maximize productivity:

Teach him how to teach both in and out of the classroom.

Teach him how to do research.

Teach him how to continue learning.

Teach him how to find the important local problems and to plan research to answer these problems.

Teach him how to do things with his own hands and to teach others by showing them, not just by telling them how.

Teach him how to work with people, not against them.

Teach him to respect, accept, and use the good ideas of those under his direction, to give credit where it is due, and to build effective team efforts for teaching, conducting research, and promoting change through extension or any other program.

Teach him that he can advance faster by helping others than by downgrading them.

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Education of American Students for Careers in Animal Agriculture of Less-Developed Countries

H. R. Bird

Some of the problems we face in training American students for careers in animal agriculture of less-developed countries are illustrated by a piece of recruiting literature issued by the Peace Corps in 1968. The potential volunteer was told, "The Peace Corps can turn you into a chicken expert in just 12 weeks. Even if you don't know the front of a chicken from the back. The Peace Corps needs chicken experts like you" (*1*).

My reaction to this statement would not look good in the proceedings of this conference, so I will not express it here. I do want to say that I think a large part of the blame for statements like this rests upon us, the professors in colleges of agriculture. We in the animal sciences have done little or nothing to interest, train, or motivate students to participate in international agriculture. If we had done so, perhaps the Peace Corps would not have to indulge in such light-hearted nonsense as I have quoted. On several occasions I have talked to Peace Corps recruiters and have found them uniformly discouraged at their lack of success with students of agriculture.

On the other hand, as Thurston (*2*) has stated in a recent article, "There is a tremendous ferment in our society today. Our youth are confused and unhappy with the world as it is. There is a great backlog of youth in our nation who want to make the world a better place in which to live. Unfortunately, they don't know how, and they have few skills. Love of humanity and the best of intentions will not make a better life for others."

Salisbury (*3*), after commenting on the difficulties encountered in staffing international agricultural projects, asked, "Why not start now to educate ourselves and new students in the intricacies of international education that this long-time venture in meeting world food needs will become? No one has had a solution for the problem of re-entry of our overseas staff into the local milieu on return. It would be no problem if we really had an on-campus program of educating people for the ultimate purpose we have talked so much about and with which we seem so reluctant to come to grips."

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I suppose every one of us here speculates from time to time on the problems of the world's needs for food and production of food. Will there be widespread and uncontrolled famines in the 1970's as has been predicted, or will food production be increased sufficiently to postpone the evil day until the 1980's or the 1990's? Will it be possible to increase food production enough to "buy time" until rational methods of population limitation are generally accepted, or will population be limited by some irrational catastrophe other than famine? Among the difficult aspects of the world food problem, not the least is the application of modern technology. How do the less-developed countries take advantage of the latest technology when most of the technical know-how is concentrated in nations that are worrying about food surpluses?

Seers (*4*) has suggested that "the gap between the institutions and policies appropriate for rich and poor countries will continue to widen just as (and largely because) the per capita income gap will continue to grow. The problem of preparing personnel for work overseas will therefore become increasingly acute.

"This raises questions about the introverted and nationalistic nature of education systems."

The students in our colleges of agriculture became motivated by one means or another to begin studying to achieve expertise in some phase of our highly developed North American agriculture. It is quite understandable that they show little interest in the more primitive forms of agriculture still in fashion in most of the world. If we wish to educate our students for careers in agriculture in the developing countries, we must acquaint them with the challenges and the opportunities for service which exist in this field. But it is not easy to make these challenges and opportunities come to life and become real in the middle of the Corn Belt.

In the first place, the college must show that it takes these challenges and opportunities seriously. For example, Cornell lists international agriculture as a department of instruction, Illinois has a list of suggested courses for students interested in international agriculture, Iowa State has an international service program in agriculture, Minnesota has an enrichment program in international affairs, and Purdue has a plan of study in international agriculture.

At the University of Wisconsin we provide an "Area of Emphasis in International Agriculture." The course requirements are as follows:

1. One introductory course in agriculture from each of the animal, plant, and social science areas; and Soils 101 or Soils 230.

2. At least two of the following courses: Cultural Anthropology, Introductory Economic Geography, International Relations, and Foundations and Problems of International Relations.

3. The equivalent of four semesters of college work in foreign languages, preferably concentrating on one.

4. At least two courses in agricultural development. These can be chosen from a list of 14 from the departments of Agricultural Economics, Agricultural and Extension Education, Economics, Geography, Political Science, and Rural Sociology.

Additional topics that are recommended but not required include livestock feeding, livestock reproduction and breeding, prevention and control of infectious diseases of livestock and poultry, and parasitic disease prevention.

You will note that the courses required in this area of emphasis are mostly social science and language courses. Yet, a student could take this area of emphasis and at the same time take a major in Dairy Science, Meat and Animal Science, or Poultry Science. The courses in his major department would be the same whether he were interested in international agriculture or corn-belt agriculture.

Our College of Agricultural and Life Sciences lists only one course on animal production related to international studies: "Pastures and Pasture Problems," offered by the Agronomy Department. We have no courses in tropical diseases of livestock or in environmental physiology of livestock. Our courses in feeding are geared to corn and soybean meal rather than to the by-products that are most available in areas where the corn is eaten by people.

At other universities, Cornell has a course in livestock production in the tropics and three courses in international nutrition problems. Minnesota has a course in animal sciences and world food problems. Purdue has a course in international animal agriculture and one in bioclimatology of domestic animals.

Apparently this limitation of course offerings is not unique to the animal sciences. Thurston (*2*) writes, "In plant pathology, I know of no course in the United States (including Hawaii and Puerto Rico) in tropical plant pathology. Little or no emphasis is given in existing courses to tropical problems . . . I suspect the situation is similar in other biological disciplines."

Obviously much of the material presented in our courses in animal, dairy, and poultry sciences is applicable anywhere in the world. Our graduates have made good use of their training from Afghanistan to Zambia. But our colleagues in the social sciences present courses entitled "Economic Problems of Tropical African Agriculture" and "Social Structure in Rural Latin America." It seems to me that after five years' work with contracts involving agricultural development in tropical countries Wisconsin should be initiating some courses related to animal production in the tropics.

Salisbury (*3*) has stated, "In our own field more attention should be paid to preparation of courses dealing with the kinds of and genetic capacity for productivity of livestock native to developing lands. We ought to offer more material on the response of animals to stress, and more particularly to heat and nutritional stress, and we ought to know much more about feeds available for livestock in the developing countries. The veterinary student, if he is to be professionally competent, must know about animal diseases whether they arise in the Rift Valley or in the Corn Belt."

Apart from the subject of special courses in tropical livestock production, there is the question as to whether we should teach the natives of Illinois or Wisconsin that there are no other feeding programs than those based on corn and soybean meal. When I say that cottonseed meal is unsatisfactory as the sole protein supplement for growing chickens, should I not also say that even poor-quality cottonseed meal may greatly improve a chick diet which otherwise contains no protein supplement at all? When I recommend to a class that one should always buy alfalfa meal guaranteed to contain 100,000 units of vitamin A potency per pound, should I not add that no such product is available in most of the world and that it wasn't available here 30 years ago? When I describe the advantages of high-energy diets, should I not also show what can be accomplished with some of the high-fiber by-products of the processing of human food?

Regardless of what course we may be teaching, we should remember that the world in which we live is only one of several quite different worlds that exist on this planet, and animals are bred, hatched, fed, milked, and slaughtered in the other worlds, too. Even the student who is going to spend his whole life in the corn belt will be better educated if he understands that animals can reproduce by means other than artificial insemination and can subsist on feeds other than corn and soybean meal.

In addition to organizing certain course programs to develop an international approach, and in addition to taking a world outlook in at least some of our animal science courses, if we are really serious about educating American students for international careers, we should give some opportunity for overseas experience during the undergraduate years. Kastelic (*5*) has commented on the "need to encourage our own students to go abroad for thesis research if they have an interest in foreign agriculture." There is no substitute for first hand experience. While the point is often made that personnel about to go overseas should receive orientation from the social scientists in order to avoid cultural shock (*6*), it has been my observation that a social scientist on his first visit to a developing country is just as likely to experience the cultural shock syndrome as is an animal scientist.

Reading a book or hearing an orientation lecture is not the same as being there.

Wisconsin has an Experimental International Student Experience Program in which "selected students are supervised by University faculty members in Brazil for a three-month period. During the semester of this supervised experience, the students have an opportunity to enroll in independent studies (correspondence studies) concurrently with special problems courses as a part of their regular load. Through the special problems course credits, the students are provided the opportunity to study agricultural and life sciences problems while engaged in the international experience program" (*7*).

Three students participated in the new program last year and three more are in Brazil now. The program is costly in terms of the students' time and the university's money — but each year the University of Wisconsin sends 55 to 65 students to spend their junior year in France or Germany studying languages, history, philosophy, classics, political science, and art. Surely problems of food production, like languages, are also most effectively studied in their native habitats.

Graduate students at the University of Wisconsin may now complete their theses and take their Ph.D. examinations in Nigeria or Brazil, two countries where Wisconsin has AID-supported programs of institutional development. At least three members of the examining committee must be Wisconsin professors. Other committee members may be nationals of the host country or professors from other U.S. institutions on assignment in the host country. So far two students, one in soils and one in agricultural economics, have taken advantage of this program, completing their Ph.D. requirements in Brazil.

I have attempted to describe some approaches to the education of American students for careers in animal agriculture of less-developed countries and to indicate the rather tentative steps that we have taken at the University of Wisconsin. We have done almost nothing about special courses except talk about them. We teach the courses that are customary in departments in animal science, with a strong orientation toward Wisconsin agriculture. We have initiated an "Area of Emphasis in International Agriculture" to call attention to the possibilities and the special requirements of this field. We have contemplated the advantages of overseas experience for undergraduate and graduate students, and we have taken a micro-step to provide such experience.

Very often the hardest part of any program is the beginning. These programs need to grow — not only to provide trained people for international service, but also to provide a broader and more rational outlook for all of our graduates. Seers' comment about "the introverted and nationalistic nature of education systems" should cause some dis-

comfort to us who are specialists in the animal sciences. Hopefully, this stimulus will cause us to react, to do something about the problem.

I might say that even if you don't know the front of an international problem from the back, the world needs international experts like you.

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U.S. Agriculturalists and the Emerging Nations

D. Woods Thomas and Frank A. Fender

In recent years a great deal has been written and said about the world food crisis, the population explosion, and the technological and scientific gaps in developing agricultural economies. Several means of resolving these issues have been discussed, but appropriate solutions and their consequences are far from clear. The response from many of the most likely sources has not been commensurate with the difficulties of modernizing the world's agriculture.

There are many reasons for this. One is that, in general, the "right people" have not done the kind of soul-searching that must precede effective action. In our opinion, the "right people" are the teachers, scientists, and scholars that constitute the highly competent academic community of U.S. schools of agriculture. Here, and only here, exists the latent capability to do more than merely bemoan the facts that much of the world is not as it should be; that two-thirds of the world's population is so poverty-stricken that it approaches economic insolvency and social disaster; and that this unhappy situation is completely inconsistent with the enlightened self-interest of the modern nations, the national objectives of the emerging nations, and the fundamental desires of the world's community of nations.

This Symposium on International Animal Agriculture sheds a positive ray of hope. It provides an opportunity for a significant number of the "right people" to think seriously about the challenges of world animal agricultural development and to consider means by which these challenges might be successfully met.

For our part we shall consider the training of U.S. agriculturalists for career involvement in international agriculture and in the agriculture of the emerging nations. We shall develop the underlying rationale of this training, examine the nature of the educational requirements for such people, explore the existing opportunities, and finally discuss certain barriers to successful educational endeavors in this area.

The rationale

It is desirable that our schools of agriculture train U.S. students for careers in international agriculture. Let us consider the following straightforward reasons for that statement:

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1. U.S. agriculture is not independent of foreign agriculture. Rather, its well-being is closely associated with what happens to agricultural and general economic development abroad. This interdependence will increase in the near future (*1, 2, 3*).

2. The United States, as a matter of foreign policy and in the national interest, has made irrevocable commitments to help the poorer nations develop economically. As a result, our government, our universities, our foundations, and other public entities are involved in helping to modernize the traditional agriculture that characterizes these nations. Meeting such international commitments will necessitate deeper, broader, and more effective involvement from all parties (*4, 5, 6, 7*).

3. The rate of future expansion of the U.S. economy, industrial as well as agricultural, will depend in large measure on both the identification and the creation of mutually acceptable profitable opportunities for investing U.S. capital and managerial skills in emerging nations (*8, 9, 10, 11, 12, 13*).

4. The greatest barrier to success in these endeavors has been and will continue to be the limited availability of highly competent professionals, who are willing and able to perform effectively, efficiently, and continuously in the technical, economic, political, and cultural environment of international agriculture (*14, 15, 16*).

5. A principle justification for the existence of U.S. schools of agriculture is their ability to respond with excellence in timely fashion to the trained manpower demands of our society.

Let us examine two aspects of the fifth assertion: the historical record of achievement, and the future prospects for acceptance of responsibility and for satisfactory performance.

U.S. agricultural professionals have been involved in foreign agriculture for generations. As early as 1876, the Massachusetts State College of Agriculture aided in the development of Hokkaido University in Japan. However, in the last 20 years the magnitude of involvement has escalated as the by-product of our nation's expanding world leadership role and our expanding agricultural economy. U.S. universities have developed and maintained numerous relationships with foreign educational and research institutions.

The Foreign Agricultural Service of the USDA currently has 175 professionals serving in foreign lands and another 300 backing up these efforts in the United States. Other branches of the USDA, via participating agency service agreements, have some 500 personnel associated directly and indirectly with ongoing professional programs both abroad and in the United States (*17*). It is estimated that by 1973, about one-fourth of all USDA executive personnel will have had experience in foreign service (*18*, p. 119).

The major foundations in their worldwide agricultural programs employ substantial numbers of U.S. agricultural professionals and support many more as visiting scientists and scholars in institutions indigenous to the less developed nations (*19*). International agencies also rely upon U.S. agriculturalists for a substantive part of their manpower needs. There is no question that U.S. corporations employ a large number of U.S. agriculturalists in their operations abroad and in their international divisions domestically.

We can only conclude that there has been and still is a substantial involvement of U.S. agricultural professionals in international and foreign work. More important is the fact that this involvement will continue to increase, both absolutely and relatively, in the future.

The problem before us is twofold. On the one hand, it is a question of the quality of performance of our overseas technicians. On the other hand, it is a question of the degree to which our present undergraduate and graduate study programs — and our opportunities for career experiences — are preparing people for this kind of career. Available evidence is too subjective and circumstantial to provide firm conclusions, so the answers to these questions can be only tentative. Nevertheless, it is imperative that the questions be asked.

With some notable exceptions, there appears to be reason for concern over the true productivity of U.S. agriculturalists overseas during the last two decades. Questions have been raised, both overtly and covertly, about the real contributions of U.S. employees of government, foundation, and development agencies, as well as the effectiveness of U.S. university personnel involved in development activities abroad (*14, 20*).

While some such ineffectiveness may be attributed to the institutional arrangements for participation, there remains just cause to doubt the adequacy and effectiveness of the preparation of U.S. people for such endeavors. In fact, rather than being astonished by some degree of ineffectiveness, we should be surprised that U.S. agriculturalists working in the international area have been as successful as they have.

There are a number of reasons for our agriculturalists' lack of effectiveness. First, the worldwide demand for U.S. agriculturalists following World War II caught this nation with no major cadre of agricultural professionals experienced in foreign agriculture. Our professional experience was primarily concerned with the agriculture of the United States. Thus, unlike the situation in colonial nations, the supply of U.S. manpower responding to demands for technical and scientific assistance had little, if any, technical background in other regions of the world, nor was there a storehouse of knowledge relative to the environmental, technological, political, economic, and cultural milieu that characterized the emerging nations.

Second, our undergraduate and graduate programs have traditionally focused on training a supply of agriculturalists equipped for domestic rather than international demands. The professional people of U.S. agriculture have generally come from rural America, and training at the undergraduate level has been cast almost wholly in the environment of U.S. agriculture, often emphasizing the problems of the state and the region wherein the educational institution was located. At the graduate level, the scope of scientific training has been based on two variables: the basic tenets of the scientific field in which the neophyte scientist was interested; and a graduate research experience dictated by the research programs being carried out by the agricultural experiment station system — programs which, both by tradition and law, have been limited to problems confronting U.S. agriculture.

Third, professional experiences beyond the formal educational period of the majority of U.S. agriculturalists has tended to be quite provincial. Agricultural scientists have followed their interests in state and federal institutions, which are almost exclusively domestically oriented. Professionals have moved from our universities into the agribusiness community which also, until recently, has been closely linked to U.S. agriculture.

The above system has been successful in supplying the demands of U.S. agriculture for personnel and knowledge. However, it is very doubtful that it provides the optimal educational environment for training agriculturalists or agricultural scientists to move into international and foreign careers.

Many, including some members of the university community, have been hypercritical of the efforts of U.S. development agencies to rapidly modernize agriculture in developing nations. It appears, however, that some major share of this criticism rests squarely on the doorstep of the schools of agriculture and the universities of this country. The weight of this criticism is a function of the degree to which we have failed to provide the public and private sectors of our country with agricultural manpower trained in a manner that permits them to perform with excellence in the non-U.S. environment. This part of the soul-searching is long overdue.

The requirements

What ingredients constitute an educational program capable of meeting the non-domestic portion of the total demand for U.S. agriculturalists? This is a matter that must be hammered out by the educators in each of the subject matter fields in agricultural science. There seem to be, however, some common needs among the several disciplines which might serve as useful guidelines. Let us examine these briefly.

First, it is clear that the preparation of an individual for effective and efficient professional involvement in international agriculture

is not a short-run endeavor. Attempts to "retread" U.S.-oriented professionals have had less than acceptable success. While it might be necessary to continue some of this temporarily, experience indicates that this is not desired solution.

Second, we must start with the young. In order to develop a really first-class group of U.S. agriculturalists capable of performing with excellence on the international scene, there seems to be no alternative to systematically "growing" this cadre of people from the "seedlings" of the new generation and the generation to come.

Third, high-level professional performance in international agriculture requires three things: the provision of highest quality training in subject matter disciplines, an early firsthand exposure to foreign agriculture, and a continuing professional involvement in international agricultural activities.

Fourth, administrators and professional colleagues must establish a set of rewards and penalties that will challenge the capable internationally oriented professional, assure him of advancement in his field, and develop the kind of performance essential to solving the world's agricultural problems.

In short, we know the educational criteria that have permitted U.S. schools of agriculture to produce the most competent domestically oriented agricultural professionals in history. Now we must squarely face the problems of applying these well-known criteria to producing a corps of agricultural professionals who will be able to seek effective solutions to problems of international agriculture.

The opportunities

Can we evolve educational programs that will be consistent with the preceding requirements? It is our firm belief that, if the schools of agriculture of the United States so choose, the opportunities for creating such educational programs are unlimited.

One reason for such optimism is that each fall our universities enroll a generation of new students who have backgrounds and training superior to that of any generation admitted to date. Additionally, our current students are characterized by deep commitments to the solution of the major social and economic problems of today's world. The raw material is now available from which to create a highly productive elite of U.S. agriculturalists trained for international endeavors.

Moreover, the technical educational capabilities of our U.S. schools of agriculture continue to improve. We are increasingly better equipped to provide the excellence of technical competence prerequisite to high-level performance in international agriculture. The investments that U.S. university personnel have made in foreign agriculture over the

last 20 years have provided a limited corps of university staff capable of teaching the kinds of academic courses and supervising the research endeavors needed to effectively train students to participate in non-U.S. agriculture.

The competence of U.S. land-grant universities in the humanities and social sciences as these refer to the developing nations, while once extremely weak, has improved immeasurably and continues to grow. This provides a resource base of inestimable value for the preparation of agriculturalists for international careers.

Modern transportation has made the emerging nations an accessible laboratory to undergraduate students. It is quite feasible to develop campus-based courses on foreign agriculture which include laboratory-field observations in the emerging nations and to arrange extended study-travel courses to these areas for students having international interests. Curricula in a few schools of agriculture in the less-developed nations are now of such quality that the internationally oriented undergraduate may now consider spending without academic risk some portion of his undergraduate years as a student abroad.[1] With a bit of institutional effort, early and meaningful involvement in foreign agriculture is a realistic alternative for undergraduates in our schools of agriculture.

Equally exciting and feasible opportunities to continue preparation for international careers exist at the graduate level. The first condition, of course, is the availability of scientific training of the highest caliber. There is no doubt about the ability of our graduate schools to meet this condition. The second condition is one of supplementing a chosen discipline with courses from other areas which will contribute to the understanding of the real issues facing developing societies and which will assure effective application of scientific competence to these relevant problems. Here, our pedagogic background and experience are limited. There is real doubt about the availability of the most meaningful offerings in our school and university curricula (*18*, pp. 128-132; *21*; *22*; *23*; *24*). Thought, experimentation, and systematic evaluation are called for.

[1] The Department of Agronomy, Cornell University, offers Agronomy 481 — Special Studies in Soils of the Tropics — which includes a ten-day field trip to a tropical soils area. The College of Agriculture, Cornell University, in cooperation with the Faculty of Agriculture and Veterinary Medicine, University of Buenos Aires, sponsors a student exchange program each academic year.

The Departments of Agronomy and Animal Sciences, Iowa State University, jointly offer Agronomy-Animal Sciences 400 — Agricultural Travel Course — which involves a field trip to major crop and livestock regions of the United States *and other countries*.

The School of Agriculture, Purdue University, is developing a formal six-week course in international agriculture and the development process, which will include a four-week travel-study program in Latin America.

The third condition is more controversial; we submit, however, that it is crucial to the adequate preparation of young U.S. scientists for international careers. A meaningful professional experience in nondomestic agriculture should be an integral part of the graduate program. To attempt to prepare young agricultural scholars for international careers without such participation would seem to negate all that experience has taught us about effective education. Here two vehicles are worthy of consideration: a professional internship as a staff member of an indigenous institution in a developing nation at, say, the post-M.S. level, or an appropriately supervised Ph.D. dissertation research experience in a developing nation. Anyone can, of course, raise a host of reasons why such endeavors are neither feasible nor desirable. The point is, both have been tried and both have proved effective (*25*).

One point remains to be made. Even the best formal education at the undergraduate and graduate levels will not guarantee a productive agricultural practitioner, scientist, or scholar on the international front any more than it will on the domestic front. Also required is the opportunity for well-prepared young people to mature as professionals in the environment of the emerging nations. It is the experience gained from continuous professional involvement with the problems of these nations that will bring dividends to the educational investments made.

Some variant of the type of educational program suggested above will produce the cadre of U.S. agriculturalists necessary for the fulfilling of our national scientific, professional, and moral responsibilities to the rest of the world. As educators, we face in our respective fields of expertise the job of fashioning programs which will yield this result.

The barriers

Next, let us examine briefly two broad categories of barriers hindering implementation of the ideas presented above. One concerns our views and our positions as U.S. educators relative to the nature and scope of our responsibilities. The other is more pragmatic.

The first of these categories includes the difficult questions that all of us concerned with agricultural education in the United States must face. We must examine our values and beliefs about training U.S. people for international careers. We must seek objective and candid answers to several questions. To what degree have we really recognized and responded to the increasing need for U.S. agriculturalists trained specifically for high-level performance in international and foreign agriculture? Are there currently available in our colleges of agriculture the types of educational opportunities that will permit bright young U.S. scientists to prepare themselves systematically for productive

and interesting employment in world agriculture? Do we have the courage to carefully examine the current relevance of the role we have traditionally accepted for our agricultural colleges? If relevance is lacking, do we have the commitment, determination, imagination, and resources to redefine this role in ways that will make our colleges more capable of responding to the present ever-changing needs of world agriculture?

These are difficult questions; they are easily avoided or put off for future consideration. We submit, however, that they are pertinent questions that must be examined in depth — and answered — before progress will be made.

One of the more pragmatic issues is the availability of financial and other resources needed to develop the kind of comprehensive educational endeavor we have suggested. The financial issue turns squarely on the structure of the agricultural education and research institutions of the United States. We do not have a "national" system of universities responsible for education and research in the agricultural sciences. Rather, we have state-supported institutions whose broad-based professional and scientific responsibilities are conditioned by specific state and regional divisions of labor. This organizational structure has been one of the great strengths of our educational and research system as it has traditionally related to U.S. agriculture. Without substantive modification, however, it is not particularly well adapted to effectively servicing the problems of world agriculture.

Given such an arrangement, we must examine with care alternative means of providing resources for the type of educational program proposed. Clearly, certain aspects of this program would appear to constitute perfectly legitimate uses of funds from existing sources. If the development of an appropriate group of courses treating matters relating to non-domestic agriculture is essential to the redefined educational responsibilities of our colleges, there would seem to be no reason why regular university resources should not be allocated for these purposes. Considerable precedent for this may be found in the non-agricultural schools and departments of our universities.

Just as important as allocating university resources for courses on non-domestic agriculture is the need for enough research to create a base of knowledge for quality presentation of these courses. The use of university resources for this purpose is as legitimate as their use for any of the other educational missions of the university. Equally, the search for new knowledge in the agricultural sciences is not bounded by arbitrary political boundaries of states and nations. Our universities would seem to have not only the rationale, but also the responsibility, to support such a quest wherever the particular "laboratory" or source of data might be.

At the same time, it is most doubtful that traditional sources of funding for agricultural education and research will be adequate to meet the magnitude of the challenge confronting us. This fact of life must be faced, not only by the universities and faculties, but also by the public policy makers of this nation. It is apparent that there is no alternative to substantive federal financing if the full weight of the scientific and educational competence embodied in our schools of agriculture is to be brought to bear on the development of agriculture around the world. Long-term financing of a magnitude and form that will permit continuous individual and institutional involvement in the international arena must be provided.

Thus on the resource side of this issue there are two problems. The first consists of difficult decisions to reallocate resources from traditional uses to uses which will permit our schools of agriculture to be the most productive in the modern world. The second is that of systematically creating an institutional framework between the federal government and the schools of agriculture capable of providing the resources needed to make our professors, scientists, and scholars productive members of a world community of agricultural research and education.

There is another barrier to the development of comprehensive international education and research programs in our schools of agriculture: institutional imperfections. Effective international education and research programs require collaboration with foreign institutions, a supply of colleagues abroad, collaborative research endeavors, and appropriate associations with international development agencies and programs of work. Our missions of the past have been such that institutional arrangements like this have not evolved to the degree that they must. The foreign involvement of U.S. schools of agriculture during the past two decades has made important inroads toward the removal of institutional imperfections, but only the initial steps have been taken. We must work diligently for the creation of a worldwide institutional network of agricultural research and educational institutions which will permit maximum productivity of such capabilities wherever they exist.

Finally, our schools of agriculture may still lack adequate professional staff who, through firsthand involvement and experience in international agriculture, possess the basic understanding and knowledge necessary for the development of educational programs of the type and excellence described in this paper. Yet our schools are far better off in this respect today than they were a decade ago. We do find among our agricultural faculties a great number of highly competent agricultural educators and scientists who have benefited from meaningful experiences of relatively long duration in agricultural development work

abroad. These people constitute a most valuable resource; we would be remiss if we did not draw heavily upon their unique knowledge and understanding.

Our schools of agriculture are at a crossroads. They may accept the challenge to contribute to international agriculture in the same tradition that has made them great in the past. If they do, we submit that they will make as great and as lasting a contribution to worldwide development, prosperity, and peace as they continue to make to our own society. If they neglect the challenge, then the prospects of mankind's attaining its universal goals will be greatly diminished. This nation simply cannot afford to pay the price of abdication by the institutions holding the greatest and potentially most productive scientific capabilities in the world.

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Effective Use of Local Resources for Thesis Research in Animal Agriculture

Richard E. Brown

The inefficiency of supplying calories and protein to humans in the form of animal products as compared to plant products is well documented — so much so, in fact, that some economists have written off animal agriculture as a significant contributor to the nutritional needs of the rapidly expanding population. The fact is, however, that all the resources of land, oceans, and technology must be tapped to fulfill the projected nutritional requirements. In some geographical areas the soil type, topography, climate, and available human potentials are unsuited for commercial crop production and can be best utilized in animal production. As animal scientists we are obligated to realistically evaluate the resources of an area before encouraging the development of animal industry.

University students have clearly expressed their concern over the major social problems of our day. In American universities most of this concern has been with domestic issues even though in the long run these issues may be relatively less important than the torrent of problems that will result from the increasing population pressures in other segments of the human family. Nevertheless, the agricultural colleges are beginning to feel the pressure from students with interests in agricultural development in various less-developed countries.

It is not surprising that most of these students have had firsthand insights into world problems through service in the Peace Corps or International Volunteer Services. It has been through providing a meaningful educational program for one such student that we became involved in finding effective ways to use local resources for thesis research in animal agriculture.

Our student had had four years' experience in teaching vocational agriculture in Laos before embarking on his Ph.D. program. He was dedicated to agricultural development work in Southeast Asia. Since none of our AID contracts are located in the area of his interest, we were faced with having to decide whether to send him to another school with appropriate contracts or to establish an arrangement with another institution or institutions by which he could conduct thesis research. We chose the latter course.

Library research confirmed our student's idea that the resources and economic status of northeast Thailand were well suited to a livestock

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industry, particularly beef production by cattle and buffalo. With the support of the Office of International Agricultural Programs of the University of Illinois, the student and I visited Thailand to define a significant problem in livestock production to serve as the subject of the thesis research and to make arrangements for facilities where the research could be conducted. Before our departure for Thailand we contacted the University of Kentucky, which has a contract to assist in the development of an agricultural experiment station in northeast Thailand. We also contacted the AID Mission in Bangkok, the Agricultural Attaché in the Embassy, the Department of Livestock Development in the Ministry of Agriculture, and the Animal Science Department at Kasetsart University. We hoped to arrange interviews with anyone who had been involved in animal production research in Thailand so that they could assist us in identifying significant problems. Our preliminary correspondence was not encouraging, but we proceeded with our planned survey nevertheless.

From the moment of our arrival in Bangkok we were given every possible assistance, even though we were only a couple of itinerant scholars in search of a problem, unattached to any formalized program in research or development. Through the good offices of Dr. R. E. Patterson of US/AID, Bangkok, we were met at the plane and later introduced to the Thai Director of Livestock Development, Dr. Chakr. Dr. Chakr arranged for us to visit six of the nine livestock stations in Thailand to talk with research personnel there and to acquaint ourselves with research in progress.

Included in the tour was a visit to the Northeast Agricultural Research Center where a University of Kentucky team was working with Thai counterparts. Nearby was the recently established Khon Kaen University with a young inexperienced staff in the College of Agriculture. The Dean of the College of Agriculture at Khon Kaen had received a Ph.D. in Animal Nutrition at the University of Illinois. He was very much interested in our project and immediately offered to provide headquarters for our studies. The staff at the Northeast Agricultural Center also offered their assistance and the use of facilities there. Thus the second objective of our survey trip was accomplished.

The selection of a significant problem for thesis research proved to be more difficult than we had anticipated. We found that research at the livestock stations consisted of keeping weight records on generally well-managed herds. The production inputs in terms of confined grazing of improved pastures and preservation of forage for feeding during the dry period were indeed effective but economically impractical from the standpoint of the average villager. There was a complete lack of data of productivity of buffalo and cattle under village conditions. No information was available on such important production parameters

as calfhood mortality, calving intervals, and growth rate. This kind of information was essential for identifying significant areas for further research, so we decided to direct our efforts toward collecting data on the village level. Such research is not sophisticated in the sense of employing complex instrumentation; nevertheless, it is difficult research, requiring the cooperation of villagers who are unable to comprehend the potential value of completely valid data. We hope that as a secondary benefit of this project, the Thai staff at Khon Kaen University will have an increased appreciation of the problems of village producers and of how science can be used to solve real problems.

The project is now underway with a graduate student on the scene. The Midwest Universities Consortium for International Activities has provided a fellowship for the graduate student, and the Southeast Asia Development Advisory Group has provided research and travel funds. No doubt unforeseen difficulties will arise during the course of the study. Hopefully, however, these problems will be solved in a satisfactory fashion, and we will learn to increase our capability for providing realistic educational programs for future students.

Education and Participation: The Latin American Environment

Jorge de Alba

Our times have been characterized by a great dynamism of ideas, an effervescence within institutions, and movements of people, materials, and goods. There is also a strong commitment to the avowed purpose of bettering the lot of mankind. To a great extent, such idealism — the conviction that "mankind" really means people of all denominations, races, and creeds — is new in man's history. Our animal husbandry fraternity has not been immune to the times and has participated in the movement of technical aid.

We of the underdeveloped world have had our share of the rise and fall of hopes and enthusiasm. As a participant from the other side of the fence, I hope to provide a touch of reality to this symposium. In particular, let me suggest that the man who intends to dedicate some or all of his life to foreign aid must tone down his innocent optimism about being an apostle of quick change. He should abandon the idea that everyone he meets abroad is going to greet his innovations with open arms. In point of fact, experience has taught us that many of those ideas are truly impractical. Also, and I say this very sadly, such a man must take into account the fact that inasmuch as some of his ideas mean displacing the status quo, he will be actively opposed by the minorities in power. They, in an environment of poorly distributed wealth, are opposed to all innovations. Stated in another way, this means that although many people are ready and anxious for change, the channels by which an outsider can make contact with the real people — not the governments — are difficult and tortuous to navigate.

Trained personnel greatest need

In all honesty I must report that the impetus for change has fallen short. Despite various approaches and techniques, the most fatal flaw has not been overcome: the lack of trained personnel.

This should come as no surprise — it is typical of our age, a technological era in which the fruit of the most brilliant and altruistic ideas is shackled by the need for an appropriate and complete technological development. Animal husbandry is no exception; it can progress only as far and as fast as the quality of the technicians allows.

As the methods of bringing about development are improved and their shortcomings reduced, I firmly believe that the personnel crisis

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will become more acute. I have recently witnessed the failure of well meant attempts to bring about a substantial change in productivity through agencies of supervised farm credit. That program offered far more tangible features than any of the previous attempts at foreign aid. It was in many respects free of the drawbacks that come with unadapted ideas and personalities, since all that was brought from the outside was money. Yet it has been a more or less qualified failure. After examining the program in detail, I came to the conclusion that it could not possibly have been otherwise. This is not a statement of complacency; rather, it is an honest statement of fact made with the intention of getting at the roots of the problem.

The credit program had no other source of personnel to be its directors, project leaders, or field men than the men traditionally trained by the country to fill mediocre bureaucratic posts. The program demanded a new philosophy of reliance on technical knowledge instead of the hunches of politicians. But the men available had no faith in scientific criteria; indeed, these men, from the very way they had gained their positions, were convinced that lip service to science was all that was required of them. With such a background they could not possibly fill the requirements for the new job.

Present animal husbandry teaching in Latin America out of touch

Most of the schools of agriculture in Latin America began late in the 19th century or early in the 20th. The strongest influences were French, Belgian, Italian, and to a lesser extent, German and Spanish. This is true of both veterinary medicine and animal husbandry.

In those early years, the European teachers were not part of any foreign aid program. Most of them came to Latin America to stay for the rest of their lives. Their influence was deep, and their dedication to the job at hand was very commendable. But several unfortunate circumstances counterbalanced those good points. First of all, most of the teachers came from countries that gave little solid grounding in the field of animal science. Secondly, the difficulties and costs of communication with their countries of origin limited the spread of new ideas and techniques. Third, there was a lack of local funds for experimentation. Consequently, those early teachers came to teach what they had been taught in Europe and hardly anything else.

The resulting education system, lacking any pragmatic urge to solve existing problems in our countries, fell on a society in which the job of tilling the soil had traditionally been a lowly one, devoid of social prestige. In most countries with large native populations, most of the agricultural problems were solved by hand labor, or if the labor supply was insufficient, by the accumulation of large acreages by the privileged classes. In either case those in agricultural power created defenses against the inefficiencies of their production methods.

This experience in the use of land, just or unjust, taught the landowner many things — not, however, for the development of agricultural education or the spread of better methods. Instead, the successful landowners sent their children to study in the cities or overseas in such fields as medicine or law. This helped limit the feedback of practical experience (the landowners') to the agricultural and veterinary colleges. There were exceptions, of course, but not very numerous or important.

Thus, up to 1950 the teaching of animal science in Latin America was largely academic, old-fashioned, and divorced from the urgent field problems at hand. Specifically such teaching was characterized by an excessive reliance on lectures, unchanged from year to year; very little use of laboratory practice; very little use of library assignments, with not much library to make use of; and stereotyped curricula with little flexibility and often absolutely no electives.

Effects of foreign aid minimized

Actually, the present situation has not changed much since 1950. But some new factors have entered the picture. Foreign aid has been added. More young men have been trained in the United States, England, Australia, and France. There have been attempts to update curricula, open new colleges with more modern ideas and orientation, and establish post-graduate studies. The effervescence of our times is evidenced by these goings-on, but the actual results at this time are not yet particularly encouraging.

To begin with, the mediocre agricultural scientists trained under the mediocre agricultural programs of the past fifty years are still with us. With the help of political friends and the passage of time, they have reached important positions of decision-making, and they are scarcely anxious for any changes that will end their jobs and their incompetent procedures. They will of course pass away eventually, but their hold on the present is so strong that I feel it is a menace to the younger generation — who are finding it easy to conform to the old pattern. Once a young man is settled in a rewarding livelihood, his role as an innovator becomes dimmed.

Short-term assignments not effective

One can cite notable achievements as the result of foreign aid, particularly on the part of foundations and programs for specific crops. Yet even the most successful projects have not touched the core of the problem. The philosophy of teaching agriculture has not changed, and this is the most urgent prerequisite for real progress.

If we emphasize that traditional animal husbandry teaching has been divorced from the local problems and has not been balanced by the results of local practice, then it becomes obvious that foreign aid administered through short-term assignments is inadequate to produce

change — and in terms of animal production, anything less than 15 years is short-term. The innovator from abroad arrives with diplomatic privileges and salaries. He uses a large amount of aid to move himself and his household; he spends much of his salary on foreign goods to be shipped back to his home country. Obviously, he does not become integrated into the social and economic fabric of the host country. If the locally trained man who could not converse with the men of his own back country was inadequate, there is not much hope that the short-term man with not even the language in his favor can make much of a contribution. The old European teachers who came at the first of the century stayed for good and became citizens of the new country. Their old-fashioned techniques took hold largely because the teachers were not foreigners anymore. Even with their shortcomings, they created a new institution at far less expense than the present programs.

I firmly believe that, if a thorough and deep examination of the nature of present failures can be candidly brought to light, these shortcomings may be overcome. First of all, the advanced countries must come to realize that no country has a surplus of brains. It is obvious that a fairly capable technician performs a creditable job largely because he is upheld by the methods and experiences of the institution where he works and by the true intellectual leaders of the institution. But transport him to an environment where the very nature of the institution is in question, and where he must become his own intellectual leader, and you will find that he will nearly always fail. The fact is, the true original leaders in this or any other developed country are rarely available for assignment abroad.

A primary requisite for success is the complete abandonment of the policy of short-term assignments. Not only should men with better training be sent on assignment, but they should be willing to live a substantial part of their lives in the country of their adoption. Their transfer should be as complete as is legally possible, with salaries paid in local currencies, under the management of local institutions. Exceptions should involve only visits and contacts so that the men do not become isolated.

Good teachers must be developed

Several new techniques should be tried and appraised. If, as we believe, good institutions are built by outstanding and technically competent men, it is obvious that some countries lack the supply of trained men necessary to revolutionize old institutions. Emphasis should be shifted from helping the inept institution to helping the apt individual. Some of the most promising men in our countries live a smothered life for lack of the most essential equipment and funds with which to advance their knowledge. For them, monetary aid is far more flexible and adaptable than the transfer of people.

The job of finding talented men is a delicate one. Youth and a degree from abroad are no guarantee that one has originality or even intelligence. What one may have been able to accomplish with limited means should point out who deserves a chance to do more work. Often all that is needed is transportation from the teaching post to the experimental stations in order to gather the research material that will improve the teaching.

At some universities the time is ripe for establishing grants for professorships or chairs. This method has been used successfully in Europe and the United States, yet it has never been tried as a tool of foreign aid.

My proposal of emphasizing help to individuals is not a crash program, nor is it expensive. It emphasizes helping those who can teach others and who can thus "multiply the good seed." Young men with new outlooks and a stirring in their minds will eventually reshape their institutions and bring about wider and more important changes. That is a job no outsider can do for them. If the process seems slow, that is all the more reason to start it soon.

Encourage capable host-country institutions

Just as I proposed aiding deserving individuals, so do I also think that promising institutions should be assisted. Such an institution may be a small branch of a larger organization, or perhaps an institution that is not in the good graces of the government. Finding these bits of hope in their jungle-like environment is no easy task — the foreign aid official must be thoroughly familiar with the country he intends to help and able to read a lot of small print (and between the lines) — but it is a necessary one.

In opposition to this, I see the dangerous procedure of creating full-fledged experiment stations or other institutions fully staffed by non-citizens of the host country, whose headquarters are in Washington, New York, or London. Such a procedure is reminiscent of the terrible mistakes of colonialism.

The development of large, foreign-inspired institutions superimposed on existing structures, or even as new ventures complete unto themselves, may give short-term satisfaction of accomplishment. Indeed, if enough money, buildings, equipment, and capable men are brought to another country, a measure of success is bound to occur. But an institution that is foreign-based, foreign-staffed, and foreign-inspired will never become part of the national structure or a permanent basis for a true national rebirth.

Let me emphasize: Help institutions that have shown capability, but never superimpose a foreign administration on the country you want to help.

The Wisconsin Experience in the University of Rio Grande do Sul, Brazil

John T. Murdock

In march of 1964 the University of Wisconsin sent its first team members, under the direction of Dr. Herbert R. Bird, to take part in an institutional development contract with the Federal University of Rio Grande do Sul (UFRGS) in Porto Alegre, Rio Grande do Sul, Brazil. Since that time the University of Wisconsin has maintained a staff of eight to ten professors in Brazil. This was one of four similar contracts between the United States and Brazilian universities financed by the United States Agency for International Development. Basically, the objectives of all four contracts were the same: to help develop the Brazilian universities into relevant institutions of higher learning with effective activities in agricultural research, teaching, and extension. The approach to this goal has been substantially different at each location, yet each contract has been reasonably effective. We may conclude, therefore, that there is no magic formula to follow in successfully administering such activities.

I shall make no effort to outline the intricacies of contract administration or to suggest a "surefire" method for successful contract operation. Rather, I shall point out some of the activities of the Wisconsin-UFRGS contract that have been most successful and the reasoning behind them.

Perhaps the most important concept our team had to grasp was that the phrase ". . . patterned after the land-grant system . . ." would have been, if interpreted strictly, extremely difficult and perhaps undesirable to achieve. UFRGS, like most other Brazilian universities, was primarily a teaching institution with practically no research or extension activities and only limited contact with rural problems. Traditionally, the professor would come to the university to teach his class and then go on to his second or third job. Most agricultural research in the state was conducted by the State Secretariat of Agriculture (S.A.), or the Federal Ministry of Agriculture (M.A.). Extension activities were conducted by the S.A., the M.A., the Rice Institute (IRGA), and the Extension Service (ASCAR). The extension activities of state and federal agencies other than ASCAR were largely "service oriented." ASCAR, a part of the Brazilian ABCAR system, is closely patterned after our cooperative agricultural extension service but has no organizational connection with the university.

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To centralize research, teaching, and extension activities for the state within the framework of the university would have required a considerable political and organizational upheaval. It would have destroyed programs that the Brazilians understood and had worked hard to make functional within their system. It would have doubtless created ill feelings and opposition to the university at a time when the university sorely needed interagency support, particularly in the form of joint staffs, to take full advantage of the assistance program. What it would have done to the attitude of the local people toward the U.S. staff on the contract goes without saying.

For these reasons, the staff chose to interpret "land-grant system" as "land-grant concept" (philosophy or idea) and to act accordingly. This meant that instead of trying to establish a U.S. system in a Brazilian situation, we were faced with a more compatible goal of helping the Brazilians develop their own system through coordinated research, teaching, and extension activities. This may appear to be a small point, but it makes a tremendous difference in attitudes, contract operations, and specific project activities.

In selecting major project areas, consideration was given to the development of the activities which were recognized as belonging to the university and which, if fully developed, would place the university in a key position in regard to agricultural programs of the state. The university's basic responsibility was to train competent agricultural specialists. To do this, the best available professional staff and teaching material, including research information, were needed. If these could be supplied, it was reasoned that the university would assume a place of leadership that would establish it in a coordinating role among the agricultural agencies of the state.

Initially the contract staff had divided opinions on the "starting place" for staff training. There was a shortage of well-trained agricultural specialists at the B.S. level, and many on the Brazilian and U.S. staffs felt that the best approach would be to concentrate on teaching undergraduates and send selected staff to the United States for training. But certain factors dictated against this approach:

1. The undergraduate curriculum was set by federal law, making it impossible for the university to make any basic curriculum changes needed to improve undergraduate teaching.

2. Much of the professors' time at the university was limited to the classroom teaching; thus, it was difficult to develop effective counterpart relationships with U.S. staff.

3. There was a general feeling that it would be difficult to change course content because of the influence of the older, more traditional chair professors. This proved to be true only to a limited extent.

4. There was little organized and relevant local research to serve as a basis for course improvement.

The other approach considered was to develop post-graduate courses in critical areas. The major objection to this approach was a general feeling that facilities were inadequate and that there was no improved job market for M.S. degree students. The federal government did not recognize advanced degrees in its civil service positions. Many felt that staff could best be supplied from training programs in the United States. The factors which dictated in favor of the post-graduate course were as follows:

1. The U.S. staff, most of whom had graduate teaching experience, could be used to greatest advantage in graduate teaching, thesis orientation, and research activities.

2. Making the graduate thesis a part of the training program could provide a logical means for the university to become involved in research programs.

3. This program would provide a large number of trained staff for undergraduate teaching, extension, and applied research in a short period of time. Such a staff would not be removed from the actual conditions of work in the state and would be more likely to stay in critical positions in the program.

4. After relatively short periods the graduate students would be excellent counterparts to U.S. staff, whereas those sent to the United States are essentially lost for periods of two to five years — assuming they return.

5. The program would provide an effective screening process for selecting candidates to go to the United States for advanced degree training.

In March of 1965 the decision was made to begin graduate programs in crop production, animal production, and soil science and to strengthen existing graduate courses in agricultural economics and rural sociology. This has been, without question, the most productive decision in the history of the contract and directly or indirectly responsible for major program accomplishments.

Within two years the results of the research activities of the UFRGS staff and graduate students began to distinguish the university as a source of information and specialized assistance. Cooperative research programs were established with the S.A., IRGA, and M.A.; by 1968, 60 major research projects were in progress, and 20 had been completed. On the basis of the results of these research activities and summaries of previous work it was possible to implement the following proposals:

1. Put soil testing on a functional basis with two model laboratories to make basic lime and fertilizer recommendations for the state.

2. Establish systems of intensive rotations with rice-pasture, wheat-pasture, and wheat-soybean rotations.

3. Set up basic recommendations as to varieties and cultural practices for major crops.

4. Establish a program of forage conservation and evaluation.

5. Identify major livestock disease and parasite problems in the state.

6. Draw up recommendations regarding rural credit needs and policies in the state.

7. Determine major factors which influence practice adoption by farmers.

The graduate courses have become an integral part of the Faculty of Economics and the Faculty of Agronomy, and 100 students have completed the course work for the M.S. degree in the last three years. The regulations for these courses are being used as a guide in establishing the post-graduate division of UFRGS in the federally ordered university reorganization.

The graduate program has had both direct and indirect effects on the undergraduate program. It has provided research information, teaching material, and staff for the strengthening of the courses. Ten graduates with M.S. degrees are now teaching at least one undergraduate course each, and 12 more have been hired as full-time teachers and researchers. New staff members have worked with older staff members to set up a new undergraduate curriculum for the university reorganization. Even high school levels have been reached by the program. Staff and students of the graduate course in agricultural and extension education, begun in 1967, have been conducting in-service training for teachers at the state's 27 vocational agriculture schools.

In 1966 an agreement was signed by UFRGS and ASCAR to coordinate the activities of the institutions, making UFRGS responsible for extension agent training and technical assistance, and ASCAR responsible for the local extension activities. Since signing the agreement, the university has engaged in an active retraining program for agronomists in the field. In 1968, 230 agronomists were given short-course training by UFRGS staff, and almost all the bankers in the state participated in short courses on rural credit.

As an outgrowth of this agreement, UFRGS and its U.S. counterparts established a pilot community development project to further train recent M.S. degree graduates and to demonstrate the impact of modern technology on the development of the Central High Plains region of Rio Grande do Sul.

This region is typical of traditional subsistence farming with diminishing production and increasing economic problems. The region's agricultural resources include deep soils with rolling topography well suited for mechanization; 60 to 70 inches of rainfall annually with

limited dry periods; hard-working farmers with a strong desire for improvement; and potentially excellent rural leadership.

Certain basic steps were taken to establish the program:

1. A natural resource survey was conducted and problems limiting agricultural production were identified.

2. Regional and county extension agronomists were retrained in basic soil fertility, conservation, and crop production problems.

3. The program was explained to the farmers through mass media (radio and newspaper), and local centers were set up in which the farmers could congregate for further explanation of the project and instruction in soil sampling techniques. Each extension agronomist was assigned to one or more of these centers.

4. Soil samples were collected at the centers and sent to the Faculties of Agronomy and Veterinary for analysis and recommendations. Over 3,000 samples from the program region were analyzed.

5. Support from government agencies and local leaders was obtained, including partial financing of the project and adequate agricultural credit.

6. A development plan was initiated involving the people of the community in an agricultural modernization program based on information collected.

During the first crop year (1967) 40 key farmers were selected to receive detailed technical assistance, and yield trials were made on 20 farms. Average yield increases on these farms were as follows: wheat, 800 percent; corn, 490 percent; and soybeans, 230 percent.

On the basis of the experience gained and the enthusiasm created by the results of the first year's work, the program was extended to include 720 farmers in the Santa Rosa region in 1968, and new programs were established in nine other regions of the state. By the end of 1970 direct assistance is expected to reach 10,000 farmers annually, and soil tests with limited recommendations are planned for an additional 25,000 farmers annually. State and national interest in the program has been expressed, and excellent interagency cooperation has been achieved.

The following factors were of prime importance in the planning and implementation of this project:

1. The research information in agronomic practices and rural credit made available by the research activities of the graduate programs at UFRGS.

2. The availability of agronomists who received their M.S. degrees at UFRGS and were familiar with local conditions to give direction to the program.

3. The availability of highly trained specialists in an advisory capacity.

4. The ability to train adequate numbers of personnel to plan and implement the project.

5. Interagency participation and cooperation.

6. Local leadership and enthusiasm for the program — thus, involvement of people on the local level.

Technically there is nothing new about this program, but it has one unique characteristic which has enabled it to function successfully: the ability to bridge the gap between planning and implementation through the retraining of large numbers of local technicians and the involvement of local leadership. The municipal governments contributed financially to the project, and such local agencies as the Rural Association participated actively. For example, the Rural Association of Santa Rosa increased its annual lime sales from 10 tons to 10,000 tons. The logistic problems connected with such an increase were overcome by the courage and foresight of the local leaders.

This short report cannot possibly reflect the many decisions and interactions which have combined to make a project of this nature successful. I hope I have given some indication of the importance of graduate instruction and research programs within the developing university, the utilization of interagency cooperation, and the involvement of rural people in activities which may well determine the future of agriculture in their area.

Education and Participation in the Reality of the World As It Is: At Home

R. H. Nelson

Almost two decades ago, several universities agreed to participate in programs of technical assistance to other countries. Whether deans, department heads, or staff influenced or agreed with that original decision, the decision was made, and departments participated, if not enthusiastically, at least passively. Effective participation, however, requires that the departments admit an obligation to involvement and accept it enthusiastically. At this time, there appears to be a consensus that such an obligation does exist, but opinions differ as to its priority.

For this discussion let us assume that the obligation has a high enough priority that we should seriously consider the best means of implementing it. In so doing, we should evaluate our experiences of the past 20 years. How much better, if at all, are our colleges of agriculture, particularly the departments of animal science, fulfilling their roles in international programs? Do we take our responsibilities in this area any more seriously now? Are we preparing the foreign students trained here to tackle the problems in their home countries? Is it possible for our own students to get the kind of training necessary to work with people in other countries to help improve their agriculture?

Education of students from other countries

Since the late 1940's, the number of foreign students in the United States has expanded greatly and now stands at more than 70,000. Some students come for special programs, others as undergraduates, but the majority come for graduate degrees. In many departments of 20 years ago, the army experiences of one or two staff members was the total of all foreign travel and experience (except Canadian) for the entire staff. It was only natural therefore that foreign students were fitted into programs identical to those followed by U.S. students except for some occasional collateral courses designed to take care of apparent inadequate preparation. What else could have been expected from a staff with no first-hand knowledge of the student's country or the type of work needing attention on his return?

Yet, even today, the increased foreign travel and experience of our staff has had little if any effect on foreign student study programs. We

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seldom take into account, for example, such things as the fact that some students are already experienced staff members in an institution in their country, whereas others are younger men who have only recently received a B.S. or its equivalent. In many cases the older, experienced students will be returning to guide or administer programs in teaching, research, and extension; a strong research degree is not necessarily the best training for such responsibilities.

The number of undergraduate foreign students has not been great, and therefore little thought has been given to their special needs. However, we could at least utilize staff members with foreign experience to advise these students. If we do not have staff experience in a particular student's country or part of the world, it might be worth the effort to put him in contact with someone in another department who may have had such experience. In many instances it may be the seemingly insignificant personal attentions that have the most lasting and worthwhile effect.

Probably little could have been done in the past to design graduate programs to fit specific needs of individual students because of the inflexibility of the requirements set by graduate schools. However, the trend towards departmental autonomy in setting requirements should allow more flexible and hopefully more suitable programs. If this trend continues, more and more responsibility regarding the appropriateness and quality of the degrees will lie with departments. It may no longer be possible to use the crutch of graduate school requirements as a reason for doing or not doing certain things.

Even though the trend is toward more departmental autonomy, that alone does not necessarily solve our problem. Consider the experience of a staff member from an agricultural experiment station in a South American country, a station statistician with a M.S. in statistics. He was given an AID grant for participant training to get a Ph.D. in statistics in the United States. After enrolling in one of our graduate schools, he found that the program emphasized theoretical statistics too much for the job he was expected to do when he returned. It could be that what he needed was something like the Ph.D. program in statistics 20 to 25 years ago. However, most statistics departments have set modern degree requirements which would make this impossible. Can we be more realistic? Too often these people return to their country educated beyond the job to be done.

The foreign student's problem of financing his education in the United States varies with the country from which he comes as well as with the university which he attends. However, in most cases, well-qualified students can find a source of support. AID participant training programs have made it possible for large numbers of students to get graduate training in this country.

The foreign student studying animal science in this country offers us a real opportunity to export technology, understanding, and friendship. Let's take full advantage of the opportunity.

Training U.S. students for foreign service

Animal science majors planning to work in another country were a rarity until only recently, and even now their numbers are few. The fact that they are scattered in various universities places so few of them at any one institution that specialized courses for their benefit are hard to justify. However, if we want to be realistic about training some students for careers in international animal science, two specific ideas may be worthy of consideration: arrangement or possible requirement of some study or experience in a foreign country at both the graduate and undergraduate levels, preferably in that part of the world where the student hopes to work; and cooperation between universities on specialized courses or curricula. Perhaps no more than half a dozen animal science departments in the entire country should offer a curriculum preparing students in this field. This could be accomplished more easily if there were reciprocity between states on out-of-state tuition for specialized curricula offered by one and not the other. The latter might even be worth consideration with regard to other low enrollment curricula in colleges of agriculture.

There can be little doubt that more and more students will be interested in preparing for a career serving agriculture in other countries. With increasing competence on the part of animal science personnel and increasing numbers of people from other countries on our campuses, it should be possible to improve the training for such careers.

Staff participation in overseas assignments

Here is the area of our greatest involvement. It is also the area with the greatest differences of opinion on the obligation to involvement and how best to implement any such obligation. In addition, it is probably the area of our least competence.

Staff experience, or more correctly inexperience, outside the United States in the early 1950's has been discussed earlier and mentioned here only because of its critical importance in overseas assignments. To some extent this deficiency has been corrected over the years as a result of continued participation in institution-building programs. However, the total number of staff years on foreign assignment is not a very objective measure of staff competence to take on the responsibility of a new project, for it is not likely that a person with overseas experience will accept a new assignment. Moreover, even if someone with previous experience is willing to go, the new assignment is likely to be in a different country with different language, beliefs, traditions, and so

forth. In other words, we are quite likely better than we were but not as good as we think we are.

Has 20 years of experience with staff members on foreign assignment resulted in any evolution in the attitude of the department or its chairman to these international programs? On the basis of the CIC-AID Rural Development Research Project reported in *Building Institutions to Serve Agriculture,* there has been considerable variation as well as change in attitudes. The general feeling of the staff and chairman of the department with which I am best acquainted is probably best described as passive, but with increasing individual willingness to accept an overseas assignment. This latter trend can probably be explained by the fact that in recent years prospective employees have been informed that they may be expected to participate in a foreign program sometime during their tenure. Actual antagonism, if it exists, is probably not against the objectives of these projects but more likely against some of the by-products.

A department chairman's attitude of passivity is often exemplified in his assistance in recruiting: He invites the project director to contact staff members concerning overseas positions but indicates that, as department chairman, he will neither urge nor discourage their acceptance. On the other hand, project directors seldom show much enthusiasm for recruiting anyone receiving a strong recommendation from the chairman. A less passive chairman, it seems to me, would at least indicate to his staff that foreign assignments would receive as much consideration in promotions and raises as do campus activities. In reality there seems to be very little difference in recruiting in 1969 and in 1951, except for possibly greater reluctance on recruiting people at retirement age.

Once a staff member has accepted an overseas position and begins the usual two years' leave from the department, he apparently begins to experience what has been described as "an assignment to ambiguity." Recently changes have been made in contracts to permit periods for orientation and language study if needed. These important modifications, however, though easy to write into a contract, are difficult to put into effective practice. If the project is not a new one, there are probably a number of staff members and administrators who can give some general orientation. However, the person best qualified to give the most useful orientation is generally the man being replaced. The orientation often consists of a period of overlap of at least two weeks at the overseas post. This orientation may actually occur in some instances, but usually the person terminating is in a hurry to get home and the new man has delays in arriving. Quite often their paths cross somewhere between home and post, and all they may get to say is, "Good luck."

No easy solution to this problem is seen under present methods of staffing projects. Currently, departments have no obligation to orientate and prepare their staff. It appears that AID has done its part in making time available for better preparation, but we have not made the necessary reciprocal efforts.

On some projects the work of the overseas staff member would be expedited by support from the home department. However, firsthand experience has shown that requests from overseas staff are lucky to get second or third priority of staff time if they get any attention at all. This is another illustration of the passive or negative attitude displayed at the department level.

One aspect of participation in technical assistance activities which has received much attention is the impact on a participant's career. An anticipated career setback is often used as a reason for refusal to serve on such an assignment. Close scrutiny might very well prove that this excuse is not based on fact. While there can be little doubt that a two-year interruption in the career of a sophisticated fundamental biological scientist could be extremely detrimental, very few such scientists have ever been asked to participate in overseas agricultural programs. An analysis of the members of our staff who have spent two to three years in technical assistance shows that in fact none has been harmed in his professional career. It is difficult to see how such an assignment could hurt one's ability to instruct undergraduates or to carry out extension or applied research programs.

There probably have been other instances, at least in the early years of the program, when people away on assignment were overlooked for salary increases and possibly also for promotions. However, with improved administration of these foreign programs, this oversight has in most cases been corrected.

Considerable criticism has been directed towards the detrimental effects of overseas programs on departmental programs at home. These effects, too, have probably been overemphasized. Most departments have learned to adjust to having staff away on sabbatical leaves — and foreign assignments are in some ways even less of a hardship, since staff salaries remain behind for temporary replacements. It would be extremely difficult to prove that our ongoing programs have deteriorated to any extent because of participation in technical assistance programs.

The return to the campus, to the department, and to the old job is where more effects are noticeable. Some return and step into the job they left apparently without losing a step, whereas others — most often younger men — may even decide to make a major change in their careers.

Recommendations and summary

Apparently continuity, staffing with experienced personnel, and enthusiastic departmental support are desirable goals. These will probably never be accomplished in a satisfactory manner until foreign programs are accepted as another phase of the department's ongoing program. To bring this about in an area such as animal science, it would seem necessary to have a minimum of two positions for international staff so that there would always be one available for foreign assignment and one on campus, with alternation between the two. Other staff would also participate in long-term and short-term assignments as the need arose.

The following is quoted from a proposal for the development of such staff at Michigan State University (Nov. 4, 1965):

"To get a more effective and expanded international program in agriculture, home economics, and veterinary science, it will be necessary to develop within key departments a core of individuals fully responsible and committed to international activity. It is envisaged that these staff, like extension specialists, would be based in new positions added to specific departments. These staff would be recruited from within the department or hired from outside sources with the joint approval of the departmental chairman and the institute director. Such positions would, like other appointments, carry the tenure policy of the university.

"It would be extremely important that such individuals be permitted to return to the university campus for approximately one year after a two-year assignment overseas. While at East Lansing, these staff members would participate in international programs on campus, catch up on developments in their fields of specialization, write up research and reports, engage in language training if necessary, and assist in department teaching and research where feasible, especially to give emphasis to international agriculture in courses and curricula. This contact is essential for both the individual and the department.

"Individuals hired as international core faculty should be accorded recognition for salary increase and promotion on an equivalent basis with other members of a specific department. On-campus activity during the home leave periods as well as overseas performance should be evaluated for merit advances. Such evaluation would likely be a joint responsibility of the department chairman and institute director.

"By setting up positions within departments specifically for international activity, experienced and capable staff for technical assistance programs could be committed for long-range involvement. Thus, there would likely be less tendency to take on greater responsibilities than a department or college could handle with its core of international staff. This arrangement would not prevent any department from

accepting additional foreign assistance contracts, assuming that such projects could be handled by staff within the department or by personnel contracted by the department from outside sources and paid through contract funds. The advantages of being able to build continuity, interest, and fiscal support into overseas projects (especially long-term commitments in institution-building and regional development research) are likely to outweigh the disadvantages associated with more flexible, but haphazard relationships in recruitment, over-staffing, and financing under the present system."

Animal science departments have participated in technical assistance programs for almost 20 years. Some improvements have been made, but they have not been commensurate with what might be expected with this much experience. If these programs are worthwhile and we are going to participate, then we should make every effort to set them up so that we can give enthusiastic, whole-hearted support. This can probably be best accomplished with departmental staff positions in international animal science. This type of organization would help not only technical assistance programs but also on-campus education programs for both U.S. and foreign students.

The Changing Pattern of Involvement Consistent with Major Goals

Orville G. Bentley

American colleges of agriculture are faced with important decisions about their future domestic and international roles in agricultural research and education. The total body of scientific knowledge is expanding rapidly, thus increasing the potential for new technological developments growing out of scientific discovery. In terms of providing research and educational support to the nation's agribusiness complex, the colleges' responsibilities are growing in both scope and complexity. In order to generate new scientific knowledge and then cast their findings into new technological forms with practical applications, colleges are finding it necessary to employ highly specialized staff members. Today's research programs require a high degree of planning and often can be investigated more efficiently by cooperating with other institutions or with counterparts in industry or government laboratories.

Teaching and extension programs must be continually restudied and revised to meet the changing manpower needs of scientific agriculture as well as the new informal educational demands of both our farm and non-farm rural population.

Colleges must also respond to the problem of building research, teaching, and public service competence for international agriculture. The national commitment to technical assistance programs in developing countries is a matter of record, but universities and colleges of agriculture are still groping for a comprehensive educational rationale and the means to implement international programs without impairing the effectiveness of their domestic commitments.

A recent International Developmental Assistance and International Education Task Force, established by the National Association of State Universities and Land-Grant Colleges and led by John A. Hannah, director of the Agency for International Development, concludes that, "With two decades of direct international involvement and experience by our institutions, our deep concern for both the immediate and the long-range self interest of our nation compels us to press for vigorous and realistic commitment to international development assistance abroad and international education at home" (*1*). In two decades we have found that the American university's philosophical basis for in-

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volvement in international programs is fraught with shortcomings. However, based on past experience, we are better prepared to build for the future. The report continues with what, in my opinion, is a significant statement: "A long-range goal, for the nation and for its universities, is a dynamic interaction among scholars, interrelating educational programs around the world. Universities in the developing countries will become respected partners of U.S. universities, fully able to educate the thinkers, leaders and technicians required for development of their nation's potential, and with research capability to keep up with the demands of modernizing agriculture, expanding industry, improving health, and other change. Reciprocally, the academic process at home will develop new generations well prepared to cope with the worldwide problems they will face"(*1*).

A series of reports on the professional school and world affairs has been developed under the auspices of Education and World Affairs (EWA). One report correctly concludes that "The response of the agricultural colleges to world affairs cannot be considered outside their rather unique context. Indeed, it is impossible to anticipate the future development of the agricultural colleges by means of the normal categories which lend themselves to an analysis of international contributions. Although the agricultural colleges confront the usual concerns of curriculum development, entertain their own uncertainties about how best to assist foreign students, and thread their way through the complex contractual relationships of work abroad, the total circumstance of an agrarian world in need of rapid change forms the tremendous pressure which is now upon them.

"The major aspects of this context for future planning are threefold:

"First, the agricultural colleges must balance short-term contributions to the world's food technology with long-term investments of resources in building research and educational institutions in the developing countries. In short, the pyramiding and critical proportion of the world's food needs places upon the agricultural colleges a demand that is perhaps greater than that faced by any other professional school.

"Second, the agricultural colleges must gain a better understanding of the basic ideas of their own history in order to understand and overcome the institutional constraints found in the developing countries.

"Third, since the agricultural colleges constitute a national system of agricultural research and education, they face the imperative that responsibilities be differentiated among them. It must be assumed that not all of the agricultural colleges, in terms of their state and regional responsibilities, can be expected to convert themselves into strong centers of international activity. Some of the colleges must take on this

worldwide responsibility, while the remainder should continue to increase their sensitivity for international affairs" (*2*, p. 44).

As colleges of agriculture attempt to develop an educational rationale to undergird their international programs, three major issues must be considered:

First: The adoption of a worldwide approach to agriculture in the training of U.S. graduate, undergraduate and foreign students. The EWA report I referred to earlier makes this strong appeal for a world view of agriculture: "The subject of world affairs gives the agricultural colleges an opportunity to change their traditional orientation from technical vocationalism to technological humanism. In relating the agricultural college to the international community, one finds a clear expression of how best to understand the application of science to the condition of man. Whatever curriculum planning may hold in store for the agricultural colleges as they move to continue their service to the United States and to accept a greater challenge in the international community, they must confront the fact that technology has become a ruling principle of culture, and that it is a way of linking the heritage of the human struggle with the meaning of the human condition. Every student educated in the agricultural colleges should know something of these principles and how they apply to the agrarian revolutions around the world. Sir Eric Ashby has suggested that every student, regardless of his future assignments, should learn to weave his technology into the fabric of society, and thus take his place among the truly liberally educated" (*2*, p. 61).

Second: Financial assistance by the federal government. The willingness of individual scientists, as well as departments, colleges, and universities to participate in international programs is important, but there is also a critical need for joint contributions and mutual understanding on the part of universities and the federal government for technical assistance programs which are consistent with the traditional university roles of teaching, research, extension, and public service. Federal funding must be handled through mechanisms that permit flexible program implementations on a continuing basis. An excellent example of a step in this direction is the limited congressional authorization under section 211d of the Foreign Assistance Act of 1966. This establishes a grant program designed to support research and educational institutions in the United States, strengthening their capacity to develop and to carry out programs concerned with economic and social developments of less developed countries.

Third: staff involvement. The success of any university or college international program will ultimately be determined by the dedication, competence, and innovative abilities of its faculty. The degree to which

staff members individually and collectively conceptualize opportunities for professionally rewarding careers and possibilities for significant service to mankind will determine the viability and success of the program undertaken by an institution. I have summarized my views concerning international agricultural programs in a pamphlet entitled "New Commitments for the Land-Grant University in a Hungry World" (*3*); certain of those comments seem appropriate for this occasion today.

"As we move through the last half of the twentieth century, the Land-Grant university faces some challenging decisions concerning its role in solving pressing societal problems both foreign and domestic. In the international arena the Land-Grant university has a unique capability for developing programs that will strengthen research and graduate teaching and for helping to establish a viable extension program aimed at promoting adoption of a new agricultural technology.

"If the Land-Grant university is to fulfill this role, it must conceptualize perspectives that include international education in its service to society. And if the colleges of agriculture are to fulfill their portion of this great mission, they must demonstrate in tangible form the scope of the involvement to the faculty and their constituents. Besides being essential to planning international programs, faculty overseas experience and campus feedback about cultural, economic, and social environments become meaningful enrichments to ongoing education and research programs. Moreover, American faculty members will find such experience essential as they serve in the role of advisers for both American and foreign students.

"We must recognize that increasing the world's capability to produce food will require many inputs besides education and research. A few of these are fertilizer, capital, labor, improved water management, price incentive policies, and more favorable attitudes towards agriculture by governments. But it is significant that the recurring theme in most economic and agricultural development programs is the need for more educational programs that are relevant to the problems and needs of the people to be served.

"The noted University of Chicago economist T. W. Schultz has said, 'The requirement calls for a transformation of existing knowledge so that it will be economically useful in poor countries and for a further advance in knowledge that will be applicable to agricultural production.'

"With imagination, energy, funds, and a commitment, the U.S. college of agriculture, in the Land-Grant tradition that has so clearly served the needs of U.S. agriculture, can make a contribution to economically developing countries, and can gain much in return. The need grows more urgent with each passing year."

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